FUJITSU

FUJITSU Server
PRIMEQUEST 2000 Series
Administration Manual

C122-E175-01EN

Preface

This manual describes the functions and features of the PRIMEQUEST 2000 series. The manual is intended for system administrators.
For details on the regulatory compliance statements and safety precautions, see the *PRIMEQUEST 2000 Series Safety and Regulatory Information* (C122-E171XA).

Errata and addenda for the manual

The *PRIMEQUEST 2000 Series Errata and Addenda* (C122-E182EN) provides errata and addenda for the manual. Read the *PRIMEQUEST 2000 Series Errata and Addenda* (C122-E182EN) thoroughly in reference to the manual.

Organization of this manual

This manual is organized as follows.

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CHAPTER 2 Operating System Installation (Link)
CHAPTER 3 Component Configuration and Replacement (Add, Remove)
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Revision History

Edition	Date	Revised location (type) (*1)	Description
01	2014-02-18	'-'	'-'

*1: Chapter, section, and item numbers in the "Revised location" column refer to those in the latest edition of the document. However, a number marked with an asterisk (*) denotes a chapter, section, or item in a previous edition of the document.

Product operating environment

This product is a computer intended for use in a computer room environment. For details on the product operating environment, see the following manual:
PRIMEQUEST 2000 Series Hardware Installation Manual (C122-H007EN)

Safety Precautions

Alert messages

This manual uses the following alert messages to prevent users and bystanders from being injured and to prevent property damage.

WARNING

This indicates a hazardous (potentially dangerous) situation that is likely to result in death or serious personal injury if the user does not perform the procedure correctly.

CAUTION

This indicates a hazardous situation that could result in minor or moderate personal injury if the user does not perform the procedure correctly. This also indicates that damage to the product or other property may occur if the user does not perform the procedure correctly.

Important

This indicates information that could help the user use the product more efficiently.

Alert messages in the text

An alert statement follows an alert symbol. An alert statement is indented on both ends to distinguish it from regular text. Similarly, one space line is inserted before and after the alert statement.

WARNING

Only Fujitsu certified service engineers should perform the following tasks on this product and the options provided by Fujitsu. Customers must not perform these tasks under any circumstances. Otherwise, electric shock, injury, or fire may result.

- Newly installing or moving equipment
- Removing the front, rear, and side covers
- Installing and removing built-in options
- Connecting and disconnecting external interface cables
- Maintenance (repair and periodic diagnosis and maintenance)

The List of important alert items table lists important alert items.

List of important alert items

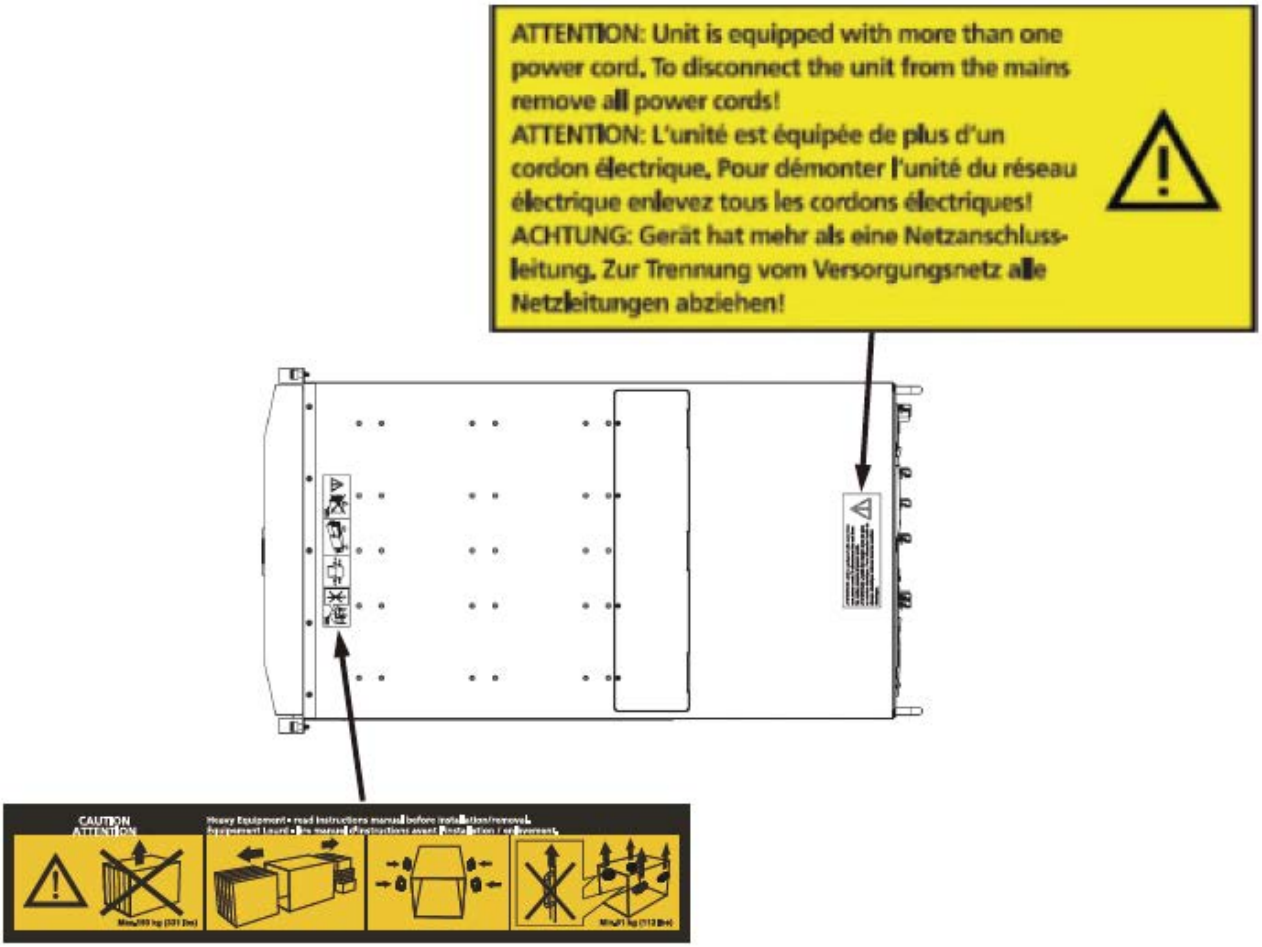
This manual does not contain important alert items.

Warning labels

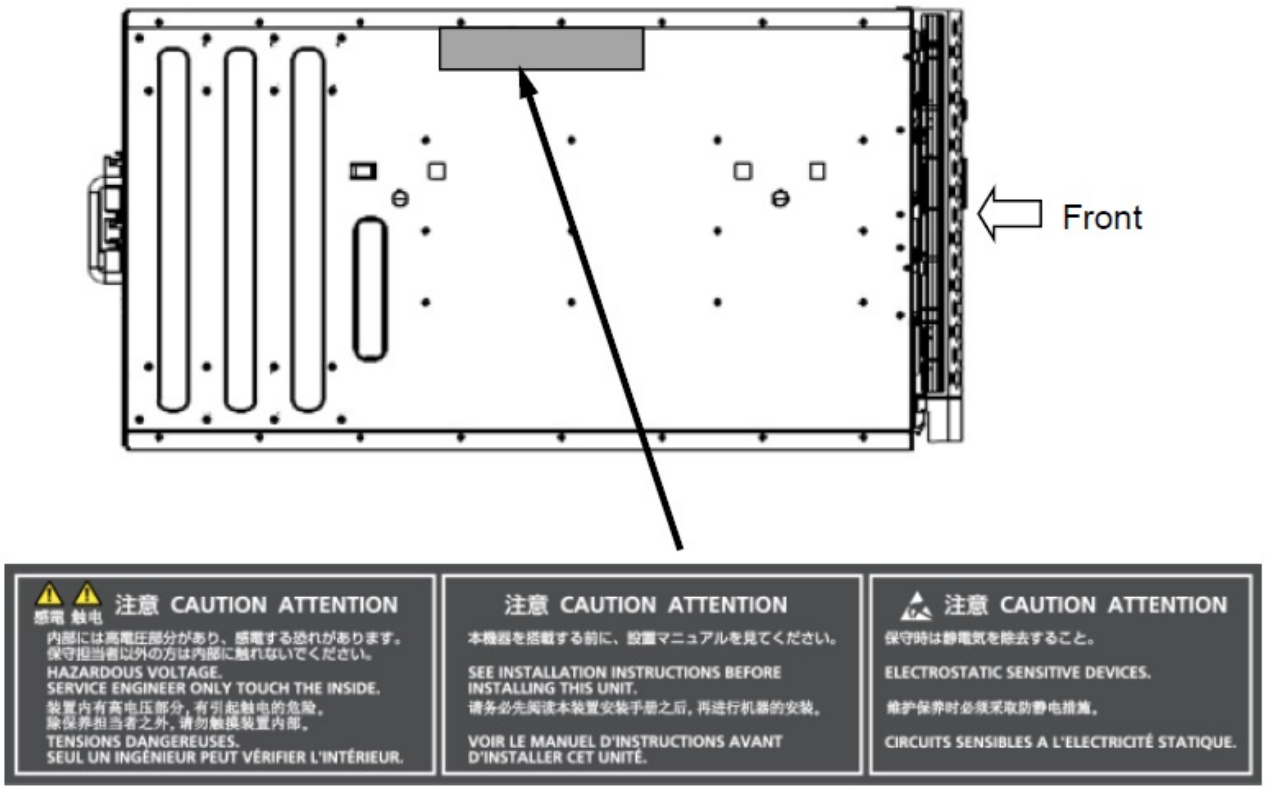
CAUTION

Never remove the warning labels.

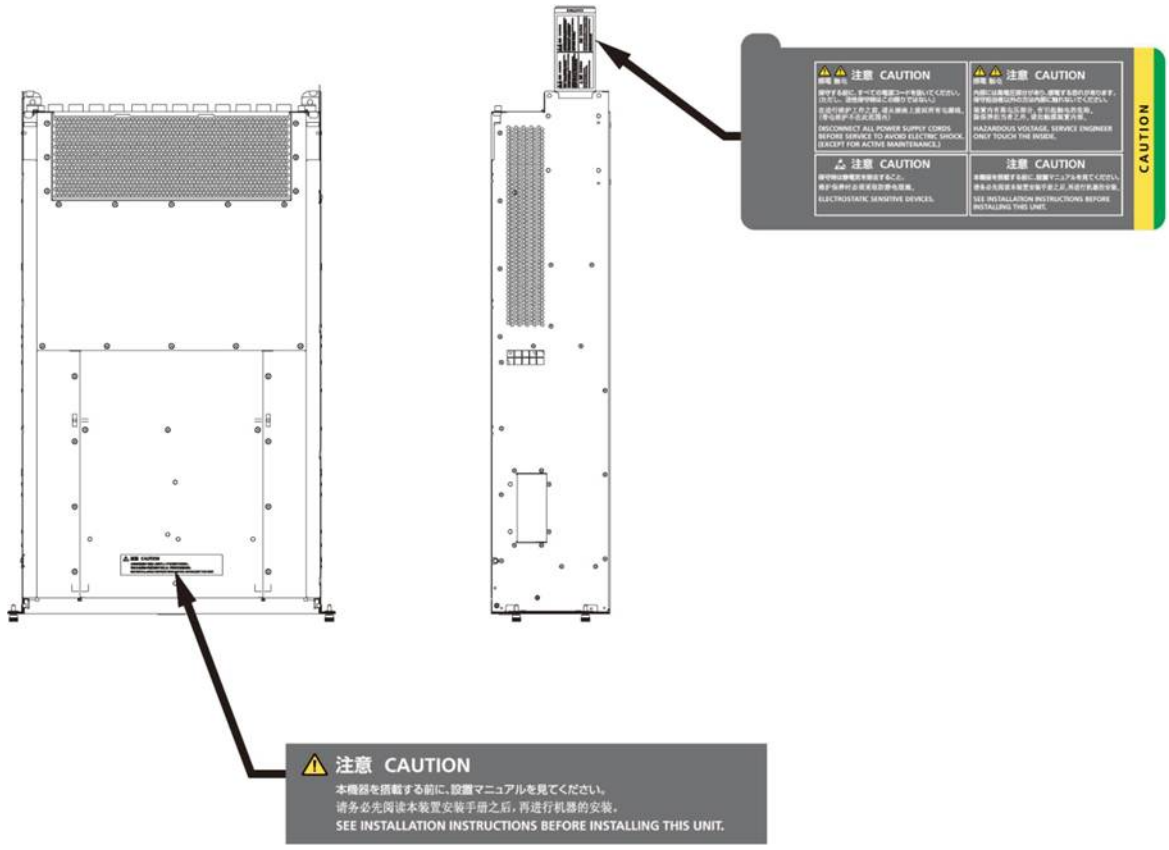
Warning label location (the main cabinet top)


ATTENTION: Unit is equipped with more than one power cord. To disconnect the unit from the mains remove all power cords!
ATTENTION: L'unité est équipée de plus d'un cordon électrique. Pour démonter l'unité du réseau électrique enlevez tous les cordons électriques!
ACHTUNG: Gerät hat mehr als eine Netzanschluss-leitung. Zur Trennung vom Versorgungsnetz alle Netzleitungen abziehen!
CAUTION
ATTENTION

Warning label location (the main cabinet left)



Warning label location (PCI_Box)



Notes on Handling the Product

About this product

This product is designed and manufactured for standard applications. Such applications include, but are not limited to, general office work, personal and home use, and general industrial use. The product is not intended for applications that require extremely high levels of safety to be guaranteed (referred to below as "safety-critical" applications). Use of the product for a safety-critical application may present a significant risk of personal injury and/or death. Such applications include, but are not limited to, nuclear reactor control, aircraft flight control, air traffic control, mass transit control, medical life support, and missile launch control. Customers shall not use the product for a safety-critical application without guaranteeing the required level of safety. Customers who plan to use the product in a safety-critical system are requested to consult the Fujitsu sales representatives in charge.

Storage of accessories

Keep the accessories in a safe place because they are required for server operation.

Adding optional products

For stable operation of the PRIMEQUEST 2000 series server, use only a Fujitsu-certified optional product as an added option.

Note that the PRIMEQUEST 2000 series server is not guaranteed to operate with any optional product not certified by Fujitsu.

Maintenance

Only Fujitsu certified service engineers should perform the following tasks on this product and the options provided by Fujitsu. Customers must not perform these tasks under any circumstances. Otherwise, electric shock, injury, or fire may result.

- Newly installing or moving equipment
- Removing the front, rear, and side covers
- Installing and removing built-in options
- Connecting and disconnecting external interface cables
- Maintenance (repair and periodic diagnosis and maintenance)

Only Fujitsu certified service engineers should perform the following tasks on this product and the options provided by Fujitsu. Customers must not perform these tasks under any circumstances. Otherwise, product failure may result. PRIMEQUEST 2000 Series General Description

- Unpacking an optional Fujitsu product, such as an optional adapter, delivered to the customer

Modifying or recycling the product

Modifying this product or recycling a secondhand product by overhauling it without prior approval may result in personal injury to users and/or bystanders or damage to the product and/or other property.

Note on erasing data from hard disks when disposing of the product or transferring it

Disposing of this product or transferring it as is may enable third parties to access the data on the hard disk and use it for unforeseen purposes. To prevent the leakage of confidential information and important data, all of the data on the hard disk must be erased before disposal or transfer of the product.

However, it can be difficult to completely erase all of the data from the hard disk. Simply initializing (reformatting) the hard disk or deleting files on the operating system is insufficient to erase the data, even though the data appears at a glance to have been erased. This type of operation only makes it impossible to access the data from the operating system. Malicious third parties can restore this data.

If you save your confidential information or other important data on the hard disk, you should completely erase the data, instead of simply carrying out the aforementioned operation, to prevent the data from being restored. To prevent important data on the hard disk from being leaked when the product is disposed of or transferred, you will need to take care to erase all the data recorded on the hard disk on your own responsibility.

Furthermore, if a software license agreement restricts the transfer of the software (operating system and application software) on the hard disk in the server or other product to a third party, transferring the product without deleting the software from the hard disk may violate the agreement. Adequate verification from this point of view is also necessary.

Support and service

Product and service inquiries

For all product use and technical inquiries, contact the distributor where you purchased your product, or a Fujitsu sales representative or systems engineer (SE). If you do not know the appropriate contact address for inquiries about the PRIMEQUEST 2000 series, use the Fujitsu contact line.

Fujitsu contact line

We accept Web inquiries. For details, visit our website:
https://www-s.fujitsu.com/global/contact/computing/PRMQST_feedback.html

Warranty

If a component failure occurs during the warranty period, we will repair it free of charge in accordance with the terms of the warranty agreement. For details, see the warranty.

Before requesting a repair

If a problem occurs with the product, confirm the problem by referring to 11.2 Troubleshooting in the *PRIMEQUEST 2000 Series Administration Manual* (C122-E175ENEN). If the error recurs, contact your sales representative or a field engineer. Confirm the model name and serial number shown on the label affixed to the right front of the device and report it. Also check any other required items beforehand according to 11.2 Troubleshooting in the *PRIMEQUEST 2000 Series Administration Manual* (C122-E175ENEN).
The system settings saved by the customer will be used during maintenance.

Manual

How to use this manual

This manual contains important information about the safe use of this product. Read the manual thoroughly to understand the information in it before using this product. Be sure to keep this manual in a safe and convenient location for quick reference.
Fujitsu makes every effort to prevent users and bystanders from being injured and to prevent property damage. Be sure to use the product according to the instructions in this manual.

Manuals for the PRIMEQUEST 2000 series

The following manuals have been prepared to provide you with the information necessary to use the PRIMEQUEST 2000 series.
You can access HTML versions of these manuals at the following sites:
Japanese-language site: http://jp.fujitsu.com/platform/server/primequest/manual/2000/
Global site:
http://www.fujitsu.com/global/services/computing/server/primequest/
http://manuals.ts.fujitsu.com/

Title	Description	Manual code
PRIMEQUEST 2000 Series Getting Started Guide	Describes what manuals you should read and how to access important information after unpacking the PRIMEQUEST 2000 series server. (This manual comes with the product.)	C122-E170XA
PRIMEQUEST 2000 Series Safety and Regulatory Information	Contains important information required for using the PRIMEQUEST 2000 series safely.	C122-E171XA

Title	Description	Manual code
PRIMEQUEST 2000 Series Errata and Addenda	Provides errata and addenda for the PRIMEQUEST 2000 series manuals. This manual will be updated as needed.	C122-E182EN
PRIMEQUEST 2000 Series General Description	Describes the functions and features of the PRIMEQUEST 2000 series.	C122-B025EN
SPARC Enterprise/ PRIMEQUEST Common Installation Planning Manual	Provides the necessary information and concepts you should understand for installation and facility planning for SPARC Enterprise and PRIMEQUEST installations.	C120-H007EN
PRIMEQUEST 2000 Series Hardware Installation Manual	Includes the specifications of and the installation location requirements for the PRIMEQUEST 2000 series.	C122-H007EN
PRIMEQUEST 2000 Series Installation Manual	Describes how to set up the PRIMEQUEST 2000 series server, including the steps for installation preparation, initialization, and software installation.	C122-E174EN
PRIMEQUEST 2000 Series User Interface Operating Instructions	Describes how to use the Web-UI and UEFI to assure proper operation of the PRIMEQUEST 2000 series server.	C122-E176EN
PRIMEQUEST 2000 Series Administration Manual	Describes how to use tools and software for system administration and how to maintain the system (component replacement and error notification).	C122-E175ENEN
PRIMEQUEST 2000 Series Tool Reference	Provides information on operation methods and settings, including details on the MMB, SVAS, and UEFI functions.	C122-E177ENEN
PRIMEQUEST 2000 Series Message Reference	Lists the messages that may be displayed when a problem occurs during operation and describes how to respond to them.	C122-E178EN
PRIMEQUEST 2000 Series REMCS Installation Manual	Describes REMCS service installation and operation	C122-E180EN
PRIMEQUEST 2000 Series Glossary	Defines the PRIMEQUEST 2000 series related terms and abbreviations.	C122-E179EN

Related manuals

The following manuals relate to the PRIMEQUEST 2000 series.
You can access these manuals at the following site:

http://www.fujitsu.com/global/services/computing/server/primequest/
http://manuals.ts.fujitsu.com/
Contact your sales representative for inquiries about the ServerView manuals.

Title	Description	Manual code
ServerView Suite ServerView Operations Manager Quick Installation (Windows)	Describes how to install and start ServerView Operations Manager in a Windows environment.	None
ServerView Suite ServerView Operations Manager Quick Installation (Linux)	Describes how to install and start ServerView Operations Manager in a Linux environment.	None
ServerView Suite ServerView Installation Manager	Describes the installation procedure using ServerView Installation Manager.	None
ServerView Suite ServerView Operations Manager Server Management	Provides an overview of server monitoring using ServerView Operations Manager, and describes the user interface of ServerView Operations Manager.	None
ServerView Suite ServerView RAID Management User Manual	Describes RAID management using ServerView RAID Manager.	None

Title	Description	Manual code
ServerView Suite Basic Concepts	Describes basic concepts about ServerView Suite.	None
ServerView Operations Manager Installation ServerView Agents for Linux	Describes installation and update installation of ServerView Linux Agent.	None
ServerView Operations Manager Installation ServerView Agents for Windows	Describes installation and update installation of ServerView Windows Agent.	None
ServerView Mission Critical Option User Manual	Describes the necessary functions unique to PRIMEQUEST (notification via the MMB, hot replacement command) and ServerView Mission Critical Option (SVmco), which is required for supporting these functions.	None
ServerView RAID Manager VMware vSphere ESXi 5 Installation Guide	Describes the installation and settings required to use ServerView RAID Manager on the VMware vSphere ESXi 5 server.	None
MegaRAID SAS Software	Provides technical information on using array controllers. Refer to the manual from the second DVD for ServerView Suite which you can purchase optionally or from the following URL: The Fujitsu Technology Solutions manuals server http://manuals.ts.fujitsu.com/	None
MegaRAID SAS Device Driver Installation	Provides technical information on using array controllers. Refer to the manual from the second DVD for ServerView Suite which you can purchase optionally or from the following URL: The Fujitsu Technology Solutions manuals server http://manuals.ts.fujitsu.com/	None
Modular RAID Controller Installation Guide	Provides technical information on using array controllers. Refer to the manual from the second DVD for ServerView Suite which you can purchase optionally or from the following URL: The Fujitsu Technology Solutions manuals server http://manuals.ts.fujitsu.com/	None

Abbreviations

This manual uses the following product name abbreviations.

Formal product name	Abbreviation
Microsoft ® Windows Server ® 2012 R2 Datacenter	Windows, Windows Server 2012
Microsoft ® Windows Server ® 2012 R2 Standard	
Microsoft ® Windows Server ® 2012 Datacenter	
Microsoft ® Windows Server ® 2012 Standard	
Microsoft ® Windows Server ® 2008 R2 Standard	Windows, Windows Server 2008
Microsoft ® Windows Server ® 2008 R2 Enterprise	
Microsoft ® Windows Server ® 2008 R2 Datacenter	
Red Hat ® Enterprise Linux ® 6 (for Intel64)	Linux, RHEL6, RHEL
Oracle Linux 6 (x86_64)	Oracle Linux, Oracle Linux 6
VMware vSphere (R) 5	VMware, vSphere 5.x, VMware 5, VMware 5.x
VMware (R) ESXi (TM) 5	ESXi, ESXi 5, ESXi 5.x

Formal product name	Abbreviation
Novell (R) SUSE(R) LINUX Enterprise Server 11 Service Pack 3	SLES11 SP3

Trademarks

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- Linux is a registered trademark of Linus Torvalds.
- Red Hat, the Shadowman logo and JBoss are registered trademarks of Red Hat, Inc. in the U.S. and other countries.
- Intel, Intel logo, Intel Inside, Intel Inside logo, Intel Atom, Intel Atom Inside, Intel Core, Core Inside, Intel vPro, vPro Inside, Celeron, Celeron Inside, Itanium, Itanium Inside, Pentium, Pentium Inside, Xeon, Xeon Phi, Xeon Inside and Ultrabook are trademarks or registered trademarks of Intel Corporation in the U.S. and other countries.
- Ethernet is a registered trademark of Fuji Xerox Co., Ltd. in Japan and is a registered trademark of Xerox Corp. in the United States and other countries.
- VMware is a trademark or registered trademark of VMware, Inc. in the United States and other countries.
- Novell and SUSE Linux Enterprise Server are trademarks of Novell, Inc.
- Xen is a trademark or registered trademark of Citrix Systems, Inc. or its subsidiaries in the United States and other countries.
- Other company names and product names are the trademarks or registered trademarks of their respective owners.
- Trademark indications are omitted for some system and product names in this manual.

Notation

This manual uses the following fonts and symbols to express specific types of information.

Font or symbols	Meaning	Example
italics	Title of a manual that you should refer to	See the *PRIMEQUEST 2000 Series Installation Manual* (C122-E174EN).
[ ]	Window names as well as the names of buttons, tabs, and drop-down menus in windows are enclosed in brackets.	Click the [OK] button.

Notation for the CLI (command line interface)

The following notation is used for commands.

Command syntax

Command syntax is represented as follows.

- Variables requiring the entry of a value are enclosed in angle brackets < >.
- Optional elements are enclosed in brackets [ ].
- Options for optional keywords are grouped in | (stroke) separated lists enclosed in brackets [ ].
- Options for required keywords are grouped in | (stroke) separated lists enclosed in braces { }.

Command syntax is written in a box.

Remarks

The command output shown in the PDF manuals may include line feeds at places where there is no line feed symbol (¥ at the end of the line).

Notes on notations

- If you have a comment or request regarding this manual, or if you find any part of this manual unclear, please take a moment to share it with us by filling in the form at the following webpage, stating your points specifically, and sending

the form to us:
https://www-s.fujitsu.com/global/contact/computing/PRMQST_feedback.html

- The contents of this manual may be revised without prior notice.
- In this manual, the Management Board and MMB firmware are abbreviated as "MMB."
- In this manual, IOU_10GbE and IOU_1GbE are collectively referred to as IO Units.
- Screenshots contained in this manual may differ from the actual product screen displays.
- The IP addresses, configuration information, and other such information contained in this manual are display examples and differ from that for actual operation.
- The PDF file of this manual is intended for display using Adobe® Reader® in single page viewing mode at 100% zoom.

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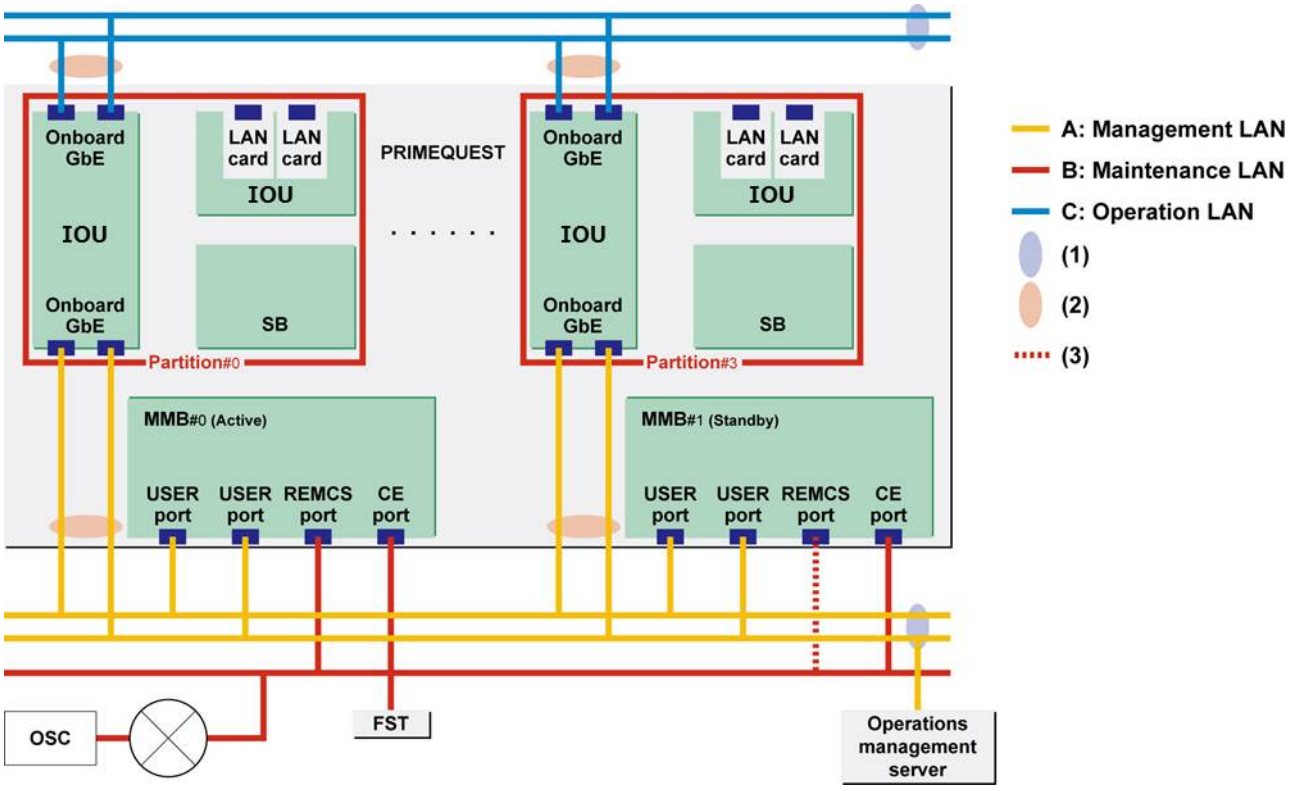
CHAPTER 1 Network Environment Setup and Tool Installation

This chapter describes the external network environment and management tool installation for the PRIMEQUEST 2000 series. For an overview of the management tools used for the PRIMEQUEST 2000 series, see Chapter 8 Operations Management Tools in the PRIMEQUEST 2000 Series General Description (C122-B022EN).

1.1 External Network Configuration

The following diagram shows the external network configuration for the PRIMEQUEST 2000 series.

FIGURE 1.1 External network configuration



No.	Description
(1)	SW redundancy
(2)	Redundancy by teaming (GLS or equivalent)
(3)	Disabled on the standby side

The following table lists the external networks. The letters A, B, and C correspond to those in FIGURE 1.1 External network configuration.

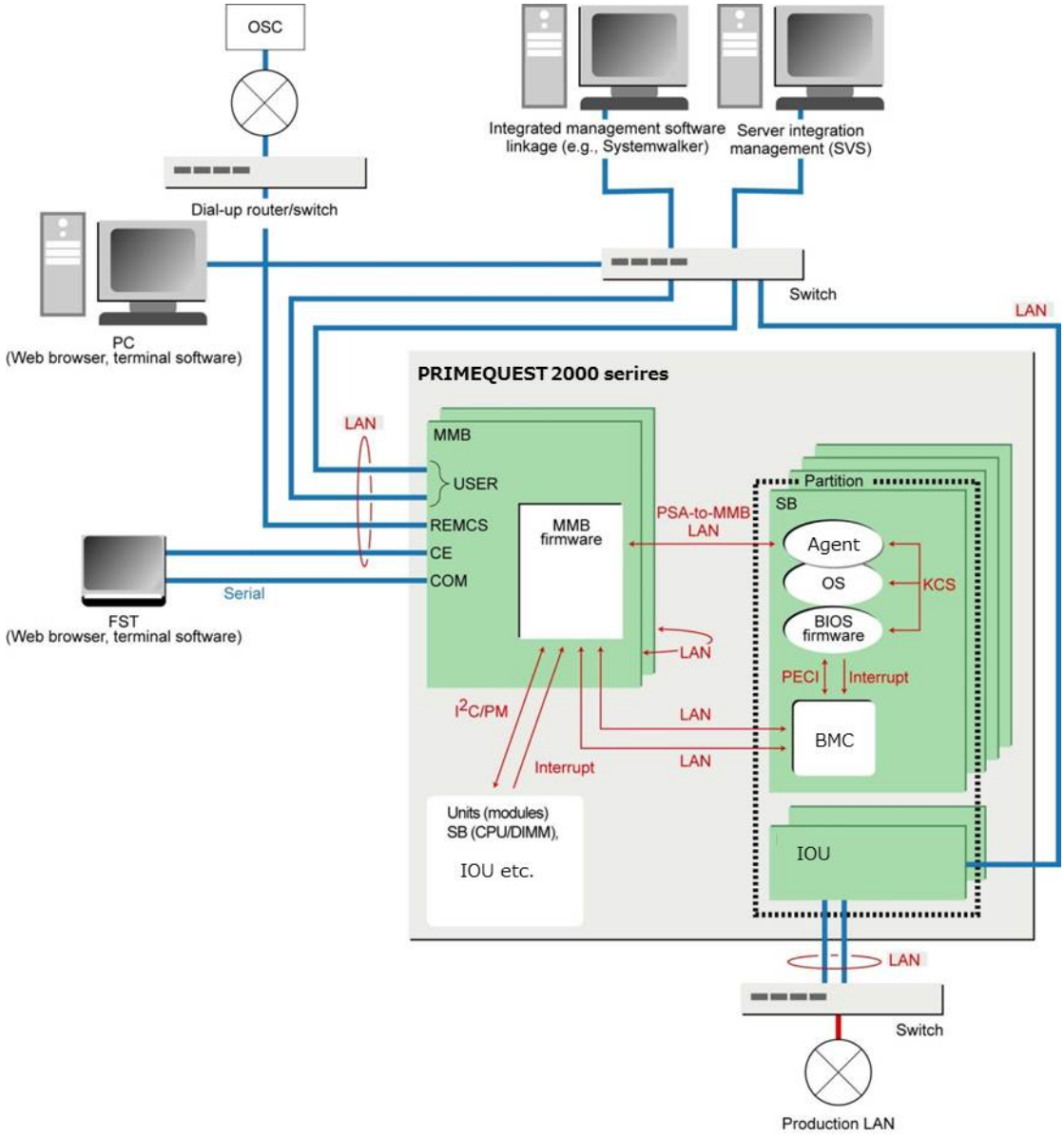
TABLE 1.1 External network names and functions

Letter	External network name	Function
A	Management LAN	- MMB Web-UI/CLI operations - Operations management server - Video redirection - PRIMECLUSTER linkage - Systemwalker linkage - ServerView linkage - REMCS connection
B	Maintenance LAN	- FST (CE terminal) connection

Letter	External network name	Function
		- REMCS connection
C	Operation LAN (production LAN)	For job operations

Connect a LAN cable for User Port and a LAN cable for REMCS Port to different HUB each other or divide them by using VLAN.
The following diagram shows the functions of external networks for the PRIMEQUEST 2000 series.

FIGURE 1.2 External network functions



1.2 How to Configure the External Networks (Management LAN/ Maintenance LAN/Production LAN)

The PRIMEQUEST 2000 series server must be connected to the following three types of external networks. The respective external networks are dedicated to security and load distribution. (See FIGURE 1.1 External network configuration.)

- Management LAN
- Maintenance LAN
- Production LAN

Note
Be sure to connect management LAN, production LAN and maintenance LAN to different subnet each other

This section describes the IP addresses for the PRIMEQUEST 2000 series server.

1.2.1 IP addresses used in the PRIMEQUEST 2000 series server

Each of the SB, IOU, and MMB units in the PRIMEQUEST 2000 series server has network interfaces. Each port of these network interfaces must be assigned an IP address.
To the ports, assign IP addresses appropriate to the external network environment of the PRIMEQUEST 2000 series server.
The following describes the IP addresses assigned to the ports.
TABLE 1.2 IP addresses for the PRIMEQUEST 2000 series server (IP addresses set from the MMB) lists the IP addresses that are set from the MMB. TABLE 1.3 IP addresses for the PRIMEQUEST 2000 series server (set from the operating system in a partition) lists the IP addresses that are set from the operating system.
The IP addresses in TABLE 1.2 IP addresses for the PRIMEQUEST 2000 series server (IP addresses set from the MMB) are assigned to the NICs (network interface controllers) on the MMBs. Each NIC is connected to an SB or an external network port of the MMB through the switching hub on the MMB. The MMB firmware uses the IP addresses.
The standard configuration has one MMB. For a dual MMB configuration, which has two MMBs, assign a common virtual IP address to both MMBs. In addition to the virtual IP address, assign one physical IP address to each MMB.

TABLE 1.2 IP addresses for the PRIMEQUEST 2000 series server (IP addresses set from the MMB)

Name	NIC	Type	IP address setting method	Description
- Management LAN IP address: MMB Virtual/Physical IP address This IP address is used for communication when the MMB is connected to the management LAN. The physical IP address is assigned to the NIC of the user port of each MMB, and the virtual IP address is assigned commonly to the duplicated MMBs. The virtual IP address is used for access from PC etc. on the management LAN. The virtual IP is inherited by an active MMB.				
Virtual IP Address	MMB (common) (*1)	Virtual IP address	Set it from the MMB CLI or MMB Web-UI.	The PC connected to the management LAN uses this IP address to communicate (via the Web, telnet, etc.) with the (active) MMB. The PC user need not be aware of which MMB is active, MMB#0 or MMB#1.
MMB#0 IP Address	MMB#0 (*1)	Physical IP address	Set it from the MMB CLI or MMB Web-UI.	The PC connected to the management LAN uses this IP address to communicate with MMB#0. (*2)
MMB#1 IP Address	MMB#1 (*1)	Physical IP address	Set it from the MMB CLI or MMB Web-UI.	The PC connected to the management LAN uses this IP address to communicate with MMB#1. (*2)
- Maintenance LAN IP address: Maintenance IP address This IP address is used for communication when the MMB is connected to the maintenance LAN.				
Maintenance	MMB	Physical IP	Set it from	This IP address is used for communication

Name	NIC	Type	IP address setting method	Description
IP Address	(common)	address (*3)	the MMB CLI or MMB Web-UI.	with REMCS, without using the management LAN. The MMB also uses the IP address to communicate with the maintenance terminal connected to the CE port.
- Internal LAN IP address: MMB-PCH IP Address This is a dedicated IP address for MMB communication with SVS running on the operating system in each partition. (*6)				
Internal IP Address	MMB (common) (*4)	Physical IP address (*3)	Set it from the MMB Web-UI.	This is a dedicated IP address for REMCS option.
- Console redirection IP address: Console Redirection IP Address				
Console Redirection IP Address	BMC	Physical IP address (*5)	Set it from the MMB Web-UI.	This IP address is used to access the console redirection function in each partition from the PC on the management LAN. An IP address on the management LAN is assigned to each partition.

*1 These three addresses must have the same subnet address.
*2 The server administrator need not be concerned with individual IP addresses specified for communication.
*3 The IP address is intended only for communication with the active MMB.
*4 It is connected to the communication of the Internal LAN, and is not connected to any external network. The assigned IP address must be in a different subnet from the management LAN, maintenance LAN, or production LAN. The default setting is 172.30.0.1/24, and it does not have to be changed unless it is in conflict with another subnet.
*5 This IP address is to access the console redirection function provided by BMC. It accesses BMC from the user port on the management LAN of MMB via the dedicated network for BMC-to-MMB communication inside the cabinet.
MMB changes the local IP address of BMC to the IP address on the management LAN by NAT. From the PC on the management LAN, the console redirection function of BMC is used via MMB.
*6 If Disable is set for this address, neither REMCS notification nor e-mail notification in case of panic.

Remarks

- A separate subnet must be assigned to "Management LAN", "Maintenance LAN" (external network), and "Internal LAN" (inside the cabinet LAN).
- Since "3. Internal LAN" is closed to the outside of the cabinet, the same subnet as that for "Internal LAN" in another cabinet can be used.
- For the IP address to be assigned to "Console redirection", the same subnet as that assigned to "1. Management LAN" must be used.
- MMB uses the following subnets permanently for internal communication.
  The following subnets cannot be specified:
  127.1.1.0/24
  127.1.2.0/24
  127.1.3.0/24

The PCH on an SB in each partition has a 100 Mb Ethernet port connected with the PCH-to-MMB communication LAN inside the cabinet. The operating system assigns the IP address of the 100 Mb Ethernet port.

TABLE 1.3 IP addresses for the PRIMEQUEST 2000 series server (set from the operating system in a partition)

LAN port	IP address setting method	Description
100 MbE port on SB (NIC in PCH) (*1)	Set it from the OS in each partition.	100 MbE port connected to the Internal LAN. This IP address and the IP address of the Internal LAN IP Address in TABLE 1.2 IP addresses for the PRIMEQUEST 2000 series server (IP addresses set from the MMB) IP addresses for the PRIMEQUEST 2000 series server (IP addresses set from the MMB) are in the same subnet. An IP address must be assigned to each partition.
LAN port in IOU	Set it from the OS in each partition.	This depends on the partition configuration.
Network card	Set it from the OS in	Each port is connected to a network outside the cabinet. The

LAN port	IP address setting method	Description
mounted in PCI Express slot in IOU or PCI_Box.	each partition.	ports in the relevant partition must have IP addresses. (Assign IP addresses to the ports used for actual operation.)

*1 The default IP address (172.30.0.[partition number + 2]) is assigned during installation of SVS. The default IP address can be used unless it is in conflict with the one in the other subnet.

Remarks

- The NIC in PCH on the Home SB is used as the NIC of the partition for internal LAN. The network device name is not defined uniquely. The NIC in PCH on the Home SB is searched by using the bus number, device number, and function number assigned to NIC.
- Even if the Home SB is switched by Reserved SB function, Internal LAN is kept communicating. MMB writes over the MAC address of the NIC in PCH on the Home SB and keeps the same MAC address as that before the SB was switched.
  For this MAC address, a unique value is assigned to each partition and managed as system FRU information so that it is unique per cabinet.
- Only “AutoNego” is supported as setting of GbE port speed in IOU_10GbE.

1.3 Management LAN

This section describes the configuration of the management LAN for the PRIMEQUEST 2000 series.

1.3.1 Overview of the management LAN

The MMB has two GbE LAN ports (USER ports) dedicated to the management LAN.
The partition side can use the LAN port on the IOU as a management LAN port. The PCL communications/ operations management server is connected to the MMB USER port through an external switch.

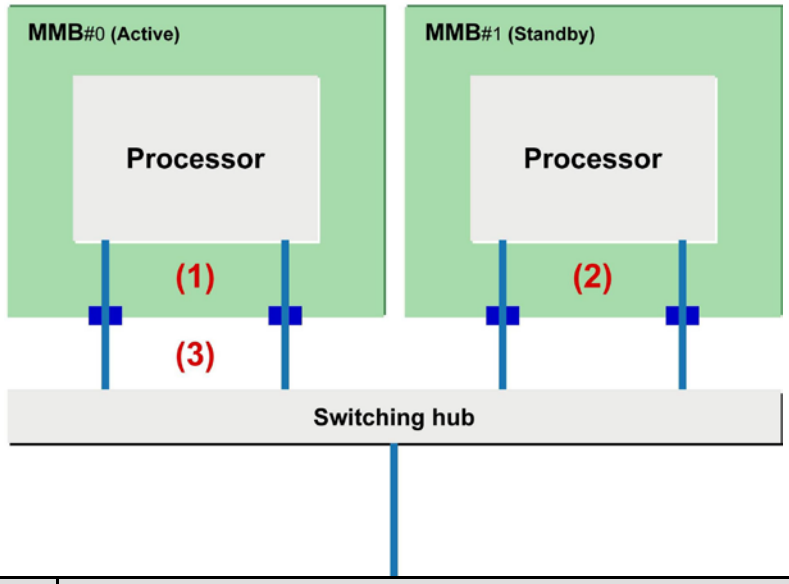
IP addresses of the management LAN (MMB)

Each MMB has one physical IP address for the management interface of the PRIMEQUEST 2000 series server. In addition to that, the primary MMB shares a common virtual IP address in the system. You can set these IP addresses from the MMB Web-UI or CLI.

Remarks

Virtual LAN interfaces are used for the management LAN interfaces. The physical LAN interfaces are used only for recognizing the respective MMBs.
The physical LAN interface of each MMB makes redundant the two User ports located in that MMB, using the interface redundancy function, to create a single LAN interface.
Virtual LAN interfaces handle the common virtual IP address shared between the two redundant MMBs. The Virtual LAN interfaces share the physical LAN interfaces, which are ports on the two MMBs. The ports are treated as valid channels on the active MMB. Any switching of the active MMB causes switching of the corresponding connections to Virtual LAN channels.
The following shows a management LAN configuration diagram. The IP addresses are examples. The addresses depend on the settings.

FIGURE 1.3 Management LAN configuration



No.	Description
(1)	Physical LAN IP example (MMB #0): 10.20.30.101
(2)	Physical LAN IP example (MMB #1): 10.20.30.102
(3)	Virtual LAN IP example: 10.20.30.100

If either USER port fails, the interface redundancy function switches to the other port in the MMB to ensure continuous service. If a failure occurs in the active MMB itself, the Virtual LAN channels become unusable. Then, the standby MMB inherits the virtual IP address from the active MMB to ensure continuous service. The following interfaces are available with a configured management LAN:

Interfaces available to the system administrator:

- Web-UI interface using HTTP/HTTPS
- CLI interface via telnet/SSH
- Partition and console operations through the video redirection function

Interface available to system management software:

- RMCP and RMCP + interface

Remarks
The restrictions on management LAN interfaces other than Virtual LAN channels are described below.

TABLE 1.4 Restrictions on the management LAN

Channel name	RMCP connection (UDP)	Web-UI connection (http/https)	CLI connection (telnet/ssh)
Virtual LAN channel	Possible	Possible	Possible
Physical LAN channel (Active MMB)	Possible	Not possible	Possible
Physical LAN channel (Standby MMB) (*1)	Possible with restrictions (*2)(*3)	Not possible	Possible with restrictions (*4)

*1 Only PRIMEQUEST 2400E and 2800E can have two MMBs. PRIMQUEST 2800B can have only one MMB.
*2 The connection cannot send or receive data of over 4 Kbytes.
*3 The connection sends data to the active MMB, so adequate performance cannot be obtained.
*4 Only the following commands can be executed:

- Set command
  set active_mmb 0
- Show commands
  show active_mmb show
  access_control show date

show timezone show gateway show http
show http_port show https
show https_port show ssh
show ssh_port show telnet
show telnet_port show ip
show network show exit_code ping
who
netck arptbl netck arping netck ifconfig netck stat
show user_list help
show snmp sys_location
show snmp sys_contact
show snmp community
show snmp trap
show maintenance_ip

IP address of the management LAN (partition)

To the partition side, an IP address of the management LAN must be assigned to communicate with SVS running on the operating system from the terminal on the management LAN. The IP address is assigned to the LAN port on the IOU or the PCI_Box mounted on the network card. Also, for monitoring with SVOM, an IP address must be assigned to the management LAN.

When it is linked with PRIMECLUSTER, the SVS on the partition side communicates with the user port of the MMB via the management LAN. It also provides the function for monitoring the status of the cluster node and the node switching function.

1.3.2 How to configure the management LAN

The network for MMB access from external terminals is the management LAN.
For management LAN-related settings for MMB access, use the CLI or the [Network Configuration] menu in the Web-UI. For details on the network configuration, see 1.1 External Network Configuration.
The following lists the settings for the management LAN configuration. Only a user with Administrator privileges can make management LAN-related settings.

TABLE 1.5 Parts of the management LAN configuration

Display/Setting item	Description
Network Interface: IP address and other settings for MMB access	
Virtual IP Address	Virtual IP address. In a dual MMB configuration, the IP address is overtaken during MMB switching. Host Name/IP Address/Subnet Mask/Gateway Address
MMB#0 (MMB#1) IP Address (*1)	Physical IP address of MMB#0 (MMB#1). You set this IP address for MMB#0 (MMB#1) mounted in the system. Enable/Disable setting Interface Name/IP Address/Subnet Mask/Gateway Address
DNS (optional)	Option. It specifies the IP address of the DNS server used. The default is 'Disabled'. Enable/Disable setting IP Address: DNS Server 1/DNS Server 2/DNS Server 3
Management LAN	Specifies duplication of the management LAN ports. The default is 'Disabled'. (Only the ports on the #0 side are enabled.) Enable/Disable setting
Maintenance IP Address	Specifies the REMCS/CE port. The default is 'Disabled'. Enable/Disable setting IP Address/Subnet Mask/SMTP Address
Internal LAN IP Address	IP Address/Subnet Mask/Gateway Address Specifies the NIC on the MMB of the Internal (PCH-to-MMB) LAN. The default is Enable and the specified [IP Address] value. The MMB blocks communication between partitions.
Management LAN Port Configuration: Management LAN port settings	
Speed/Duplex for MMB#0 (MMB#1) (*1)	Specifies a Speed/Duplex value for the MMB#0 (MMB#1) LAN ports. Port: USER Port, Maintenance Port Setting value: Auto (default), 1G/Full, 100M/Full, 100M/Half, 10M/Full, 10M/Half The MMB USER port is duplicated. The speed of 1 Gbps can be specified only for the USER ports. The possible

Display/Setting item	Description
	settings for the respective ports depend on the MMB hardware configuration.
Network Protocols: Network protocol settings	
HTTP, HTTPS, telnet, SSH, SNMP	Specifies whether to enable or disable a protocol, the port number, and the Timeout time.
SNMP Configuration: SNMP-related settings	
SNMP Community	Specifies SNMP System Information and Community/User values. - System Information: Specifies System Location and System Contact values for SNMP. It also displays the system name specified from [System] - [System Information]. - Community: Can specify up to 16 Community/User items. Each Community/User item includes the access-permitted IP address, SNMP version, access permission, and authentication settings. For settings specific to SNMP v3, use the SNMP v3 Configuration menu.
SNMP Trap	Specifies SNMP trap destinations. You can set up to 16 destinations. Each trap destination item includes the Community/User name, destination IP address, SNMP version, and authentication level settings. - [Test Trap] button: Sends a test trap to the specified trap destination.
SNMP v3 Configuration: Settings specific to SNMP v3	
Engine ID	Specifies the Engine ID. - Enter the encryption hash function, authentication passphrase, and encryption passphrase for users.
SSL: SSL settings	
Create CSR	Creates a private key and a request for a signature (CSR: Certificate Signing Request) - SSL certificate status: Displays the current status of SSL certificate installation. - Key length: Length of the private key, 1024 bits or 2048 bits - Entered information on the owner specified for the CSR - Country, prefecture, city/town, organization, department, server, e-mail address - [Create CSR] button: Displays a confirmation dialog box. Clicking [OK] creates a new private key and a request for a signature. After completion, a dialog box appears. Clicking [OK] registers the private key and causes a jump to the [Export Key/CSR] window. Clicking [Cancel] gives an instruction to discard the created private key and CSR.
Export Key/CSR	Exports an MMB private key/CSR (backup). - [Export Key] button: Exports a private key. - [Export CSR] button: Exports a CSR. **Note** Clicking the [Export Key] button/ [Export CSR] button using FireFox 4 or later flashes a save confirmation dialog box, resulting in the secret key not being downloadable. Therefore, use Internet Explorer during [Export Key/Export CSR] window manipulation.
Import Certificate	Imports a signed electronic certificate sent from a certificate authority. To import a file, specify the file, and click the [Import] button.
Create Selfsigned Certificate	Creates a self-signed certificate. - SSL certificate status: Displays the current status of self-signed certificate installation. - Term: Specifies the term of validity (number of days) of the self-signed certificate. - The other settings are the same as on the [Create CSR] window. - [Create Selfsigned Certificate] button: Creates a self-signed certificate.
SSH: SSH settings	
Create SSH Server Key	Creates an SSH server private key. - SSH Server Key Status: Displays the status of SSH server key installation. - [Create SSH Server Key] button: Creates a private key. After creation is completed, a confirmation dialog box appears. Clicking [OK] installs the created key. Clicking [Cancel] discards it.

Display/Setting item	Description
Remote Server Management: User settings for remote control of the MMB via RMCP - Use the [Edit User] button to select the user to be edited. The default settings for all users is [No Access] and [Disable]. - You can edit the user name, password, permission, and status (Enable/Disable) in the [Edit User] - To deny access to a user, set [No Access] for permission or [Disable] for [Status].	
Access Control: Access control settings for network protocols	
[Add Filter]/[Edit Filter]/ [Remove Filter] button	Adds, edits, or deletes a filter.
[Edit Filter] window	- Protocol: Select the target protocol (HTTP/HTTPS/telnet/SSH/SNMP). - Access Control: Select [Enable] or [Disable]. - Disable: Denies access by any IP address. - Enable: Permits access by only the specified IP addresses. - IP Address/Subnet Mask: You can specify this item only if the [Access Control] setting is [Enable]. The filtering permits access by only the IP addresses specified here.
Alarm E-Mail: Settings for e-mail notification of an event	
Alarm E-Mail	Used to select whether to send e-mail for the occurrence of an event (Enable/ Disable).
From	Sender address
To	Destination address
SMTP Server	IP address or FQDN of the SMTP server
Subject	E-mail title
[Filter] button	Used to edit Alarm E-mail transmission filter settings. The occurrence of any event specified in the filter settings is reported by e-mail. The default for target events is all events. - Severity: Target severity (Error/Warning/Info) - Partition: Target partition - Unit: Target unit - Source: Target source (CPU/DIMM/Chipset/Voltage/Temperature/ Other)
[Test E-Mail] button	Sends test e-mail.
Video redirection/remote storage network settings	
[Partition] - [Console Redirection Setup] menu	The video redirection/remote storage network relays traffic through the MMB, so the BMC IP address is not seen by users. Users access the system via the management LAN of the MMB. Here, specify the IP address used for access by the video redirection client (Java applet). The MMB handles address conversion between the specified address and BMC IP address.

*1 Only PRIMEQUEST 2400E and 2800E can have two MMBs. PRIMQUEST 2800B can have only one MMB.

The settings of the management LAN on the partition side are made on the operating system. These are required to access SVS from a management PC on the management LAN. SVS also communicates with the MMB via the management LAN to monitor and to switch cluster nodes in the PRIMECLUSTER linkage.
To the NIC to be used for the management LAN, the LAN port on IOU or the network card mounted in the PCI_Box is assigned. Following is used for Management LAN:

- Onboard LAN ports in IOU.
- PCI express card in IOU or PCI_Box.

The subnet of the management LAN shares the virtual IP address and the physical address of the MMB, which are specified by Web-UI/CLI on the MMB.
The management LAN and production LAN can be configured in the same subnet. In such case, an IP address is assigned to both the management LAN and the production LAN on the partition connected to the subnet of the LAN to which the MMB User Port is connected.

1.3.3 Redundant configuration of the management LAN

For the MMB, only MMB#0 is mounted as standard. By mounting MMB#1, the MMB can be redundant for PRIMEQUEST 2400E and 2800E. MMB cannot be redundant for PRIMEQUEST 2800B. For PRIMEQUEST 2400E and 2800E, when the MMB detects an error in the MMB itself, it switches the active MMB so that operations can continue. When the active MMB is switched, the virtual IP address is inherited by the MMB that becomes active. Therefore, the administrator does not to need to consider which MMB is active.

Because the MMB cannot recognize errors occurring in the path for accessing the MMB user port from the management LAN, it is unable to recover from them by switching the active MMB. Therefore, two user ports of the management LAN are mounted on the MMB. This redundant configuration enables recovery from management LAN errors. The redundant configuration of the user port is disabled as standard, and only user port #0 is enabled.
When the redundant configuration of the user port of the management LAN is enabled, the NICs on both user port #0 and user port #1 are enabled. These two NICs appear as one virtual interface from external devices because of the bonding function (each MMB has a physical address and a MAC address).
The MMB monitors errors of the management LAN (including connections to unit-external switches and LAN cable disconnections). When it detects an error, it switches the duplicated NIC so that the monitoring operation, which includes the Web-UI operations, can continue. The values of the physical IP address and the MAC address of the MMB prior to switching are maintained.
To set up the management LAN in a redundant configuration, select [Network Configuration] - [Network Interface] from the MMB Web-UI, and then set Enable for [Dualization] of [Maintenance LAN].
For the redundant configuration of the management LAN on the partition side, duplicate the NIC by teaming with Linux Bonding driver, GLS or Intel PROSet.
When the MMB is duplicated, but the management LAN user port of the MMB is not duplicated, if an error occurs on the management LAN, MMB access is disabled in PRIMEQUEST 2400E and 2800E. Because the MMB does not recognize its error, it does not automatically switch the active MMB, and the virtual IP address of the MMB cannot be switched to the available MMB. In such cases, the active MMB must be switched manually. The procedure is described below for only PRIMEQUEST 2400E and 2800E.

- (When MMB#0 is active, and MMB#1 is standby, an error occurs during an attempt by the management LAN to access the user port on the MMB#0 side, and MMB#0 access is disabled)

1. Connect to the physical IP address of the management LAN user port on MMB#1 with telnet/ssh.
2. Execute the following command on MMB#1, and switch the active MMB to MMB#1.

```
> set active_mmb 1
```

3. The virtual IP address of the MMB is switched to MMB#1, and access is enabled with the virtual IP address.

1.4 Maintenance LAN/REMCS LAN

The MMB provides the following LAN ports for maintenance purposes.

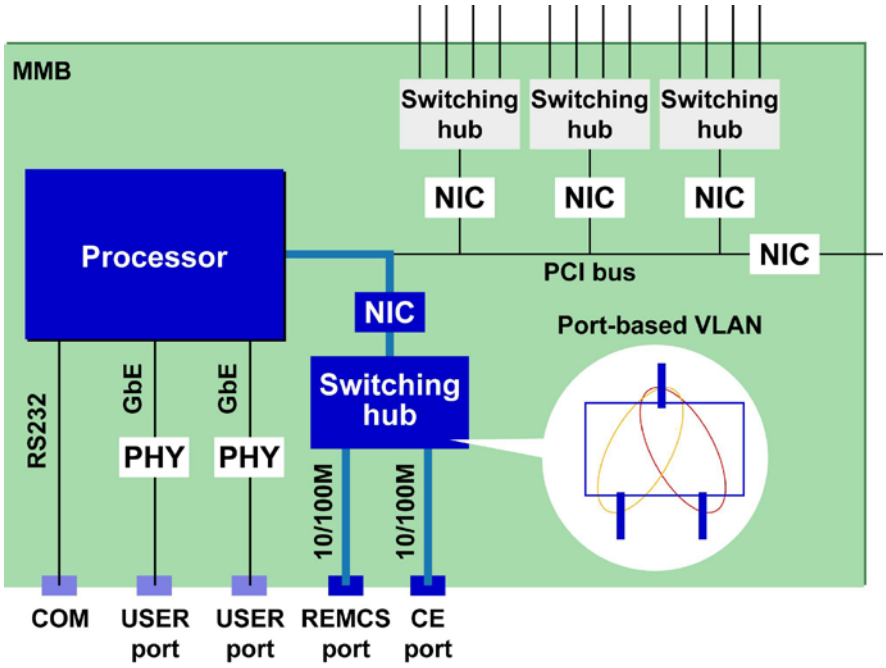
TABLE 1.6 Maintenance LAN/REMCS LAN

Port	Description	Remarks
CE LAN	FST (CE terminal) port for use in maintenance work	100Base-TX, RJ45
REMCS LAN	For a connection with the REMCS Center (*)	100Base-TX, RJ45

*: For REMCS connection without using the management LAN

The port-based VLAN function of the switching hub on the MMB blocks communication between the CE port and REMCS port. The following shows an outline of the maintenance LAN and REMCS LAN of the MMB.

FIGURE 1.4 Maintenance LAN and REMCS LAN of the MMB



The maintenance LAN is configured with Web-UI or CLI of the MMB. The subnet of the maintenance LAN must be separated from the other subnets such as one for the management LAN, the production LAN, etc. When the MMB is duplicated, the maintenance LAN can only access to the MMB on the active side. The NIC on the standby MMB is disabled.

Remarks

The active and standby MMBs in the PRIMEQUEST 2000 series server each have a CE terminal port used in maintenance and a LAN port for REMCS notification. Communication through the ports is enabled only on the active MMB and disabled on the standby MMB. A field engineer configures the maintenance LAN and REMCS LAN during system installation.

1.5 Production LAN

This section describes the configuration of the production LAN for the PRIMEQUEST 2000 series.

1.5.1 Overview of the production LAN

The IOU includes LAN ports for the production LAN.

You can mount additional LAN cards in the PCI Express slots on the IOU and PCI_Box as needed, to use their ports for the production LAN.

1.5.2 Redundancy of the production LAN

This section describes redundancy of the production LAN.

Duplication of the transmission path between servers (high-speed switching method)

For details on duplication of the transmission path between servers, see 'PRIMECLUSTER Global Link Service Configuration and Administration Guide Redundant Line Control Function' (J2UZ-7781).

Duplication between the server hub/switch in the same network (Virtual NIC method/NIC switching method)

For details on duplication between the server hub/switch in the same network, see PRIMECLUSTER GLS for Windows User's Guide' (B1FN-5851-04Z2).

Teaming by Intel PROSet

The teaming configuration using Intel PROSet is available. For details, see the help for Intel PROSet.

1.6 Management Tool Operating Conditions and Use

This section describes the operating conditions and use of the management tools.

1.6.1 MMB

The MMB Web-UI operating conditions are as follows.

Supported Web browsers

Firefox version 20 or later (operating system: Windows or Linux)
Internet Explorer version 8 or later (operating system: Windows)

Maximum number of Web-UI login users

Up to 16 users can log in to the Web-UI at a time. If 16 users have logged in when another user attempts to log in, a warning dialog box appears and the login attempt is rejected.
The MMB Web-UI login procedure is as follows.

1. Specify the URL of the MMB in the Web browser to connect to the MMB.
   >> The [Login] window appears.
2. Enter your user name and password.
   >> The [Web-UI] window ([System] - [System Status]) appears.

MMB user privileges

User privileges specify the levels of MMB operating privileges held by user accounts.
Only users with Administrator privileges can create, delete, and modify user accounts.
For details on operations permitted (i.e., privileges) in the MMB Web-UI menus, see Chapter 1 MMB Web-UI (Web User Interface) Operations in the *PRIMEQUEST 2000 Series Tool Reference* (C122-E110EN).

NTP client function setting on the MMB

In the PRIMEQUEST 2000 series, the MMB acts as an NTP client to ensure synchronization with external NTP servers.

1.6.2 Remote operation (BMC)

Supported Web browsers

Firefox version 20 or later (operating system: Windows or Linux)
Internet Explorer version 8 or later (operating system: Windows)

Required Java Runtime Environment

Java 6 or later
Notes

- For a terminal whose operating system is Windows Vista or Windows 7, set UAC (User Account Control) or UAP (User Account Protection) to "Disabled".
- For video redirection and virtual media, a connection may not be established if the network is connected via a proxy. In such cases, change the browser setting to avoid network connection via the proxy.
- To start the video direction function with Internet Explorer, click the mouse while holding down the [Control] key. Even if the following message is displayed, click the mouse while holding down the [Control] key.
- Message displayed on the status bar of Internet Explorer
  "Pop-up blocked." (To allow the pop-up window to open, click the mouse while holding down the [Ctrl] key. With FireFox, you can establish a connection simply by clicking the mouse.
- If " java.net.SocketException: Malformed reply from SOCKS server" occurs when you attempt to establish a video redirection connection, make the following browser setting.
  - For Internet Explorer:
    1. Select [Tools] - [Internet Options] - [Connection] tab - [LAN Settings] - [Proxy Server] - [Advanced].
    2. Uncheck [Use the same proxy server for all protocols].
    3. Clear the Socks field.
  - For FireFox:
    1. Select [Tools] - [Options] - [Network] tab - [Connection Settings].
    2. Check [Manual proxy configuration].
    3. Uncheck [Use this proxy server for all protocols].
    4. Clear the SOCKS field.
- Window may be maximized when you attempt to establish a video redirection connection or during video redirection connection. In such cases, change to window size suitable for environment of your terminal.

Maximum number of connections

The following lists the maximum number of connections using the remote operation (BMC) function.

TABLE 1.7 Maximum number of connections using the remote operation function

Item	Description
Video redirection	Up to 2 users can be connected concurrently. However, only 1 user can perform operations. The other user can only refer to information.
Virtual Media	Up to two devices can be connected for floppy, CD or DVD, Hard disk drive, independently.

The operating conditions for BMC installation of individual BMC functions is described below.

Operating environment settings

You need to make the appropriate settings for video redirection and virtual media for your network environment. In the [Console Redirection Setup] window of the MMB Web-UI, set the IP address and subnet mask, and set enable or disable for video redirection and virtual media.
For details on setup by MMB Web-UI, see ‘1.3.6 [Console Redirection Setup] menu’ in “*PRIMEQUEST 2000 series Tool Reference*” (C122-E177EN).

Video redirection

With the video redirection function, users can access windows for the partition side from a remote location. When a user starts video redirection from the [Console Redirection] window of the MMB Web-UI, a Java applet is sent to the user's terminal. Through the Java applet, the terminal displays VGA output sent to the LAN.
User input with the mouse or keyboard on the terminal is routed through the LAN to the partition.
List of video redirection function is shown below.

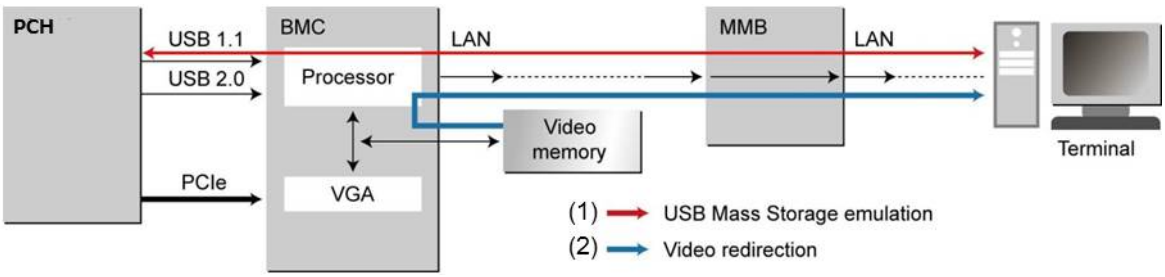
TABLE 1.8 List of video redirection function

Function	Description	Note
Window	Perform operation of screen display such as pause, zoom-in,	

Function	Description	Note
	zoom-out and language selection.	
Keyboard	Operate keyboard by keyboard of terminal PC.	Special key cannot be used directly.
Virtual keyboard	Display and operate virtual keyboard	
Mouse	Operate mouse by mouse of terminal PC. A mouse pointer in a partition and a mouse pointer in a terminal PC run simultaneously. Display of mouse in a terminal PC can be set to enable or disable. Position of mouse can be set to 'Relative mode' where next position is calculated by previous action or 'Absolute mode' which is orthogonal coordinates.	
Special key	Send key operation of [Ctrl], [Alt], and [Windows] key. [Lock] key holds down the [Ctrl], [Alt], or [Windows] key.	
Power	Power on, power off, or re-start a partition.	

The following shows a diagram of the connection configuration for video redirection.

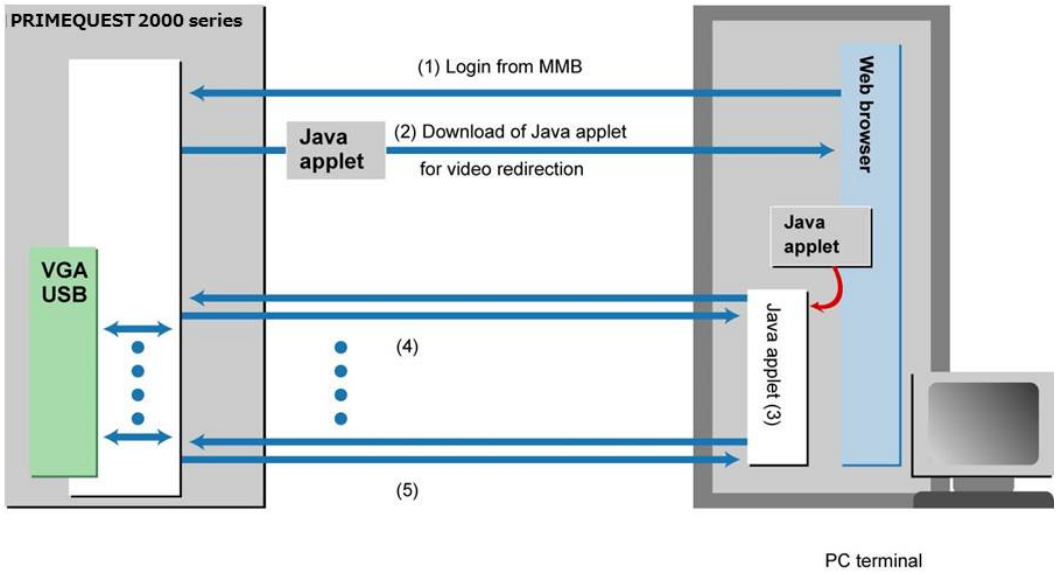
FIGURE 1.5 Connection configuration for video redirection



No.	Description
(1)	USB keyboard emulation and mouse emulation
(2)	Video redirection

The following shows the operating sequence of video redirection.

FIGURE 1.6 Operating sequence of video redirection



In the diagram, (1) to (5) indicates the following operations.

(1) Log in to the server from the terminal.

(2) Display the window, and start video redirection.

(3) You can perform partition operations from the [Video Redirection] window by using the keyboard and mouse.

(4) You can perform partition operations through the Java applet for video redirection.

(5) Exit video redirection.

The following shows an example of the [Video Redirection] window.

FIGURE 1.7 [Video Redirection] window

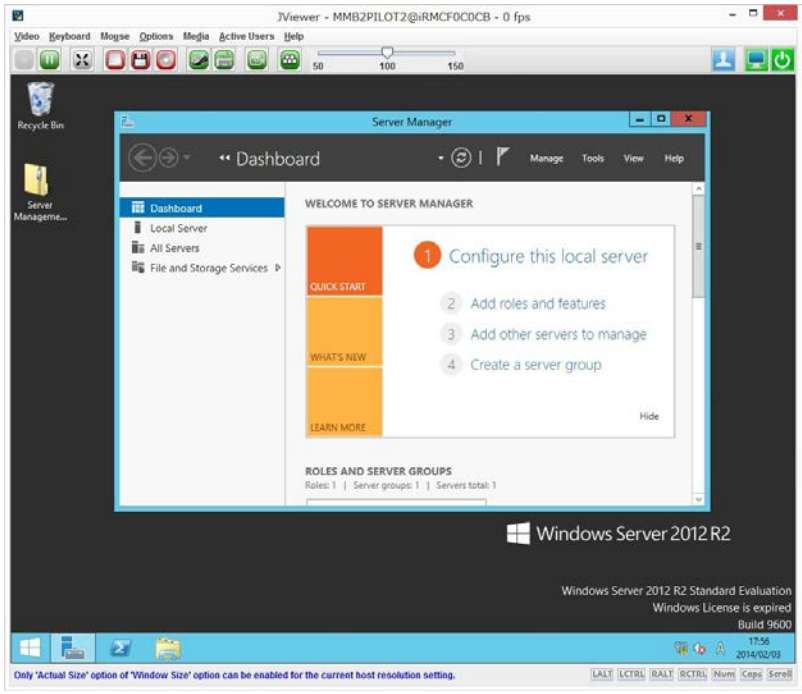


TABLE 1.9 Menu Bar in [Video redirection] window

Menu Bar	Description
Video	

Menu Bar			Description
	Pause Redirection		Perform pause of [Video redirection] window.
	Resume Redirection		Release pause of [Video redirection] window.
	Refresh Video		Refresh [Video redirection] window.
	Turn ON Host Display Video		Show video operation on host monitor.
	Turn OFF Host Display		Show video operation on host monitor.
	Low Bandwidth Mode		Set bits per pixel (bpp) of [Video redirection] window.
		Normal	Set 'Normal'.
		8 bpp	Set '8 bpp'.
		8 bpp B&W	Set '8 bpp monochrome'.
		16 bpp	Set '16 bpp'.
	Capture Screen		Capture [Video redirection] window. The screen is preserved into terminal PC in jpeg format.
	Full Screen		Maximize [Video redirection] window. It is required that client and host are the same resolution.
	Start Record		Start to record [Video redirection] window. The video is preserved into terminal PC in avi format.
	Stop Record		Stop to record [Video redirection] window.
	Settings		Perform setup for record of [Video redirection] such as record time and save location.
	Exit		Close video redirection.
Keyboard			
	Hold Right Ctrl Key		Hold down right [Ctrl] key. [RCTRL] button turns red.
	Hold Right Alt Key		Hold down right [Alt] key. [RALT] button turns red.
	Hold Left Ctrl Key		Hold down left [Ctrl] key. [LCTRL] button turns red.
	Hold Left Alt Key		Hold down left [Alt] key. [LALT] button turns red.
	Left Windows Key		
		Hold Down	Hold down [Windows] key.
		Press and Release	Press [Windows] key.
	Right Windows Key		
		Hold Down	Hold down [Windows] key.
		Press and Release	Press [Windows] key.
	Ctrl+Alt+Del		Press [Ctrl] key, [Alt] key, and [Del] key simultaneously.
	Context Menu		Open Context Menu (shortcut menu).
	Hot Keys		
		Add Hot Keys	Set Hot keys (shortcut key).
	Host Physical Keyboard		
		Auto Detect	Set to 'Auto Detect' Physical keyboard type is detected automatically.
		English(United States)	Set to 'English (United States)'.
		French	Set to 'French'.
		German(Germany)	Set to 'German'.
		Japanese	Set to 'Japanese'.
		Spanish	Set to 'Spanish'.
	SoftKeyboard		
		English(United States)	Set to 'English (United States)'.
		English(United Kingdom)	Set to 'English (United Kingdom)'.
		Spanish	Set to 'Spanish'.
		French	Set to 'French'.
		German(Germany)	Set to 'German (Germany)'.
		Italian	Set to 'Italian'.
		Danish	Set to 'Danish'.
		Finnish	Set to 'Finnish'.
		German(Switzerland)	Set to 'German (Switzerland)'.
		Norwegian(Norway)	Set to 'Norwegian'.
		Portuguese	Set to 'Portuguese'.
		Swedish	Set to 'Swedish'.
		Hebrew	Set to 'Hebrew'.

Menu Bar			Description
		French(Belgium)	Set to 'French (Belgium)'.
		Dutch(Belgium)	Set to 'French.'
		Russian(Russia)	Set to 'Russian'.
		Japanese(QWERTY)	Set to 'Japanese (QWERTY)'.
		Japanese(Hiragana)	Set to 'Japanese (Hiragana)'.
		Japanese(Katakana)	Set to 'Japanese (Katakana)'.
		Turkish - F	Set to 'Turkish -F'.
		Turkish - Q	Set to 'Turkish -Q'.
Mouse			
	Show Cursor		Display cursor.
	Mouse Calibration		Perform calibration of mouse location.
	Show Host Cursor		Display host cursor.
	Mouse Mode		
		Absolute mouse mode	Set a mouse to 'Absolute mode'. A mouse pointer in [Video redirection] window is adjusted to absolute value of a mouse pointer in terminal PC.
		Relative mouse mode	Set a mouse to 'Relative mode'. A mouse pointer in [Video redirection] window is adjusted to relative position calculated by difference from previous position of a mouse in terminal PC.
		Hide mouse mode (*1)	Set a mouse to 'Hide mode'. This mode should be used if action of a mouse pointer in [Video redirection] does not match with that in terminal PC.
Options			
	Keyboard/Mouse Encryption		Encrypts keyboard data and mouse data.
	Window Size		
		Actual Size	Return size of [Video redirection] window to normal size (100%).
		Fit to Client Resolution	Fit to resolution of client window.
		Fit to Host Resolution	Fit to resolution of host window.
	GUI Languages		
		DE - Deutsch	Set menu display to 'German'.
		EN - English	Set menu display to 'English'.
		JA - 日本語	Set menu display to 'Japanese'.
Media			
	Virtual Media Wizard		Set virtual media.
Active Users			
	:		Display user who is performing video redirection.
Power (*2)			
	Power On		Power on a partition.
	Immediate Power Off		Power off a partition immediately.
	Power Cycle		After powering off a partition, power on a partition again.
	Press Power Button		Press power button.
	Immediate Reset		Perform hardware reset.
	Pulse NMI		Issue NMI.
	Graceful Reset (Reboot)		Perform Graceful Reset (Reboot).
	Graceful Power off (Shutdown)		Perform Graceful Power off (Shutdown)
	Set Boot Options		Perform setup of Boot Options.
Help			
	About JViewer		Display version information. If you click the "About JViewer", it may take a few minutes to appear the dialog box that displays the JViewer information. You cannot operate the video redirection in the meantime. In such a case, please wait a while for the dialog box to appear, or stop the javaw.exe task in task manager and then restart the video redirection.
	Server Information		Display information of server.

(*1) Set mouse mode to 'Hide mouse mode' when operate LSI WebBIOS since action of cursor in LSI WebBIOS is adjusted to actual action of your mouse cursor.

When you use two displays to operate LSI WebBIOS in Legacy Mode, use primary display of monitor 1. If you set to 'Hide mouse mode' in secondary display of monitor 2, cursor does not run. Even if you set to 'Hide mouse mode', it is no problem to use primary display and operate UEFI.

(*2) Power menu is shown in only PRIMEQUEST 2800B. It is not shown in other models.
Sometimes you cannot operate any power operations because power button menu is grayed out. In such case, reconnect the video redirection to select power menu button or perform the power operation by [Power Control] window of MMB Web-UI.

TABLE 1.10 Tool Bar menu in [Video redirection] window

Tool bar	Description
[Resume Redirection]	Release pause of [Video redirection] window.
[Pause Redirection]	Perform pause of [Video redirection] window.
[Full Screen]	Maximize [Video redirection] window. It is required that client and host are the same resolution.
[Hard disk/USB]	Set virtual media.
[Floppy]	Set virtual media.
[CD/DVD]	Set virtual media.
[Cursor]	Display cursor.
[Softkeyboard]	Display software keyboard.
[Video Record]	Perform setup for record of [Video redirection] such as record time and save location.
[Hot Keys]	Set Hot keys (shortcut key).
[Zoom]	Zoom in or Zoom out [Video redirection] window.

TABLE 1.11 Status Bar in [Video redirection] window

Status Bar	Description
[LALT]	Hold down left [Alt] key. [LALT] button turns red.
[LCTRL]	Hold down left [Ctrl] key. [LCTRL] button turns red.
[RALT]	Hold down right [Alt] key. [RALT] button turns red.
[RCTRL]	Hold down right [Ctrl] key. [RCTRL] button turns red.
[Num]	Hold down right [Num] key. [Num] button turns red.
[Caps]	Hold down right [Caps] key. [Caps] button turns red.
[Scroll]	Hold down right [Scroll] key. [Scroll] button turns red.

Note

- When resolution of window in server is 800 x 600, a part of window displayed in video redirection may luck or track of mouse cursor may remain during installing Linux.
- While the video redirection is being used, a warning message indicating that the digital signature is expired may be displayed. Since this warning message does not affect the operation of Java Application, click the [Execute] button. To avoid displaying this waning message every time the video redirection is connected, check the check box for [Always trust content from this publisher], and click the [Execute] button.
- Network communication problems between the terminal and PRIMEQUEST may cause a session interruption, resulting in the [Video Redirection] window failing to respond to user operation. In such cases, the window cannot be closed normally. Reconnect to the network after forcibly ending the video redirection.
- If below problems occur while using video redirection, reconnect video redirection.
  - No response comes from video redirection and any operation cannot be performed.
  - Display of video redirection window remains black or 'No Signal'.
  - Error dialog of video redirection appears and any operation cannot be performed.
  - Window of video redirection is disconnected unintentionally.

Below description is how to connect video redirection.

1. First terminal PC is connected to a partition by video redirection with Full Virtual Console Access.
2. If you connect to same partition by video redirection, a massage requesting permission to virtual console access appears in second terminal PC.

FIGURE 1.8 Message of requesting access to Virtual Console in second terminal PC

Requesting permission for Virtual Console access from the user MMB2PILOT2 with IP address [redacted] (28 seconds remaining)

3. In first terminal PC, window where connection privilege of second terminal PC is selected appears. Select connection privilege from below.

   - Allow Virtual Console
     permit Full Virtual Console access where all operation of video redirection can be performed.
   - Allow only Video
     permit only video where display function of video redirection can be performed.
   - Deny Access
     deny access to video redirection.

   If thirty seconds passes, [Allow Virtual Console] is selected.

FIGURE 1.9 Popup window of [Virtual Console Sharing Privileges]

4. Popup which shows result selected by first terminal PC.

   - Display in first terminal PC.
     Such below window is displayed depending on result of selection except for [Allow only Video].

FIGURE 1.10 Popup for [Allow Virtual Console] in first terminal PC

FIGURE 1.11 Popup for TIMEOUT in first terminal PC

INFORMATION
Granted Full Virtual Console access to user MMB2PILOT2 with IP [redacted] due to Virtual Console access request time out.
OK

   - Display in second terminal PC.
     Result selected by first terminal PC is shown below in second terminal PC.

FIGURE 1.12 Popup for [Allow Virtual Console] in second terminal PC

FIGURE 1.13 Popup for [Allow only video] in second terminal PC

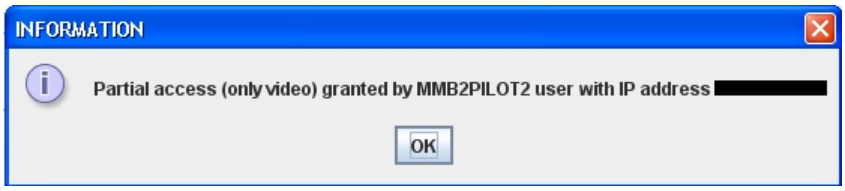


FIGURE 1.14 Popup for [Deny Access] in second terminal PC

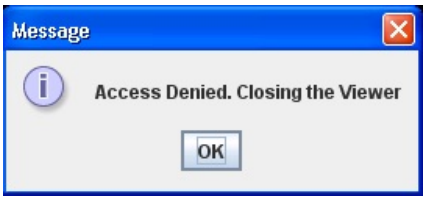
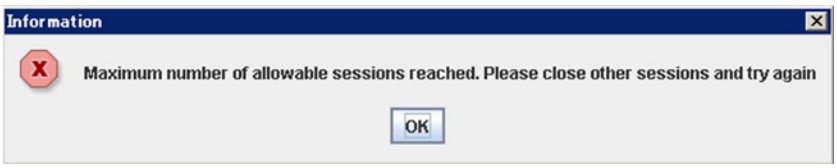


FIGURE 1.15 Popup for TIMEOUT in first terminal PC

INFORMATION
Full access privilege to Virtual Console received due to request timeout from MMB2PILOT2 user with IP address
OK

- Display in third terminal
  If you try to open video redirection in third terminal PC, the dialog box instructing that connect again after closing other video redirection since the number of connection reaches the maximum of permitted number for video redirection.

FIGURE 1.16 Popup for reaching maximum number of connection in second terminal PC



Console redirection

PRIMEQUEST 2000 series provides console redirection to route serial output from partitions via a LAN.
Console redirection conforms to the specifications of IPMI v2.0 SOL (Serial Over LAN).
When you perform console command with the partition specified on MMB CLI, console output to the COM port on the partition is redirected. Input from the terminal is reported to the COM port on the partition.

Connection period of text console redirection

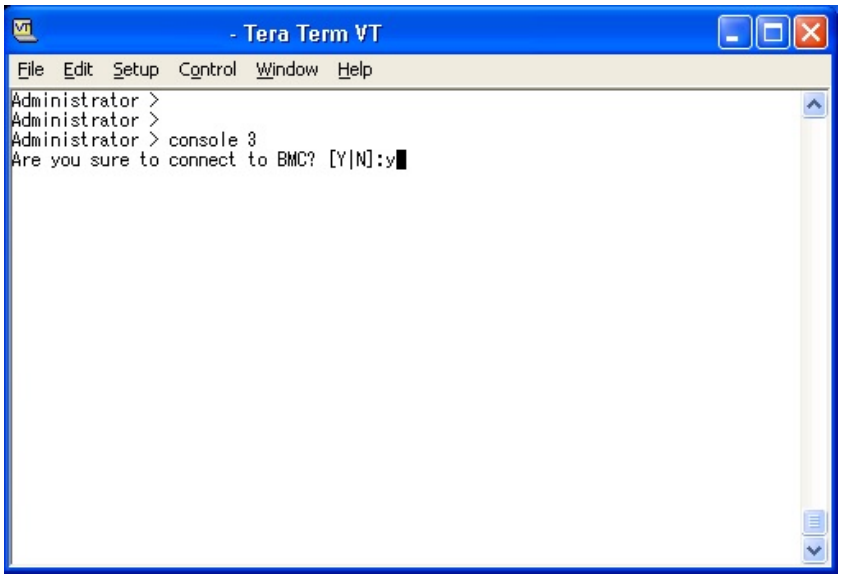
Console redirection is automatically disconnected after a certain idle time. You can set automatic disconnection time, timeout value, by console command.
For details on console command, see '2.2.4 console' in "*PRIMEQUEST 2000 series Tool Reference*" (C122-E177).

How to connect console redirection

Note
If console redirection is disconnected due to timeout, below message appears.
"You have exceeded your idle time limit. Logging you off now."

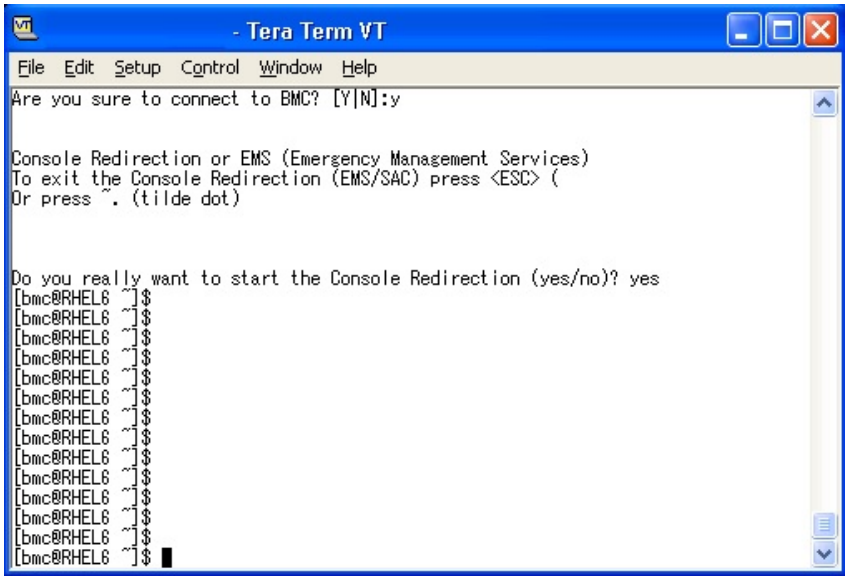
1. Login to MMB CLI and specify partition to which you intend to connect.
   If the message which confirms whether you connects or not appears, input 'y'.

FIGURE 1.17 Example of setting partition #3 (1)


- Tera Term VT
File Edit Setup Control Window Help
Administrator >
Administrator >
Administrator > console 3
Are you sure to connect to BMC? [Y|N]:y

2. If the message “Do you really want to start the Console Redirection (yes/no)?” appears, input ‘yes’. You can connect to specified partition.

FIGURE 1.18 Example of setting partition #3 (2)


- Tera Term VT
File Edit Setup Control Window Help
Are you sure to connect to BMC? [Y|N]:y
Console Redirection or EMS (Emergency Management Services)
To exit the Console Redirection (EMS/SAC) press <ESC> (
Or press ~. (tilde dot)
Do you really want to start the Console Redirection (yes/no)? yes
[bmc@RHEL6 ~]$

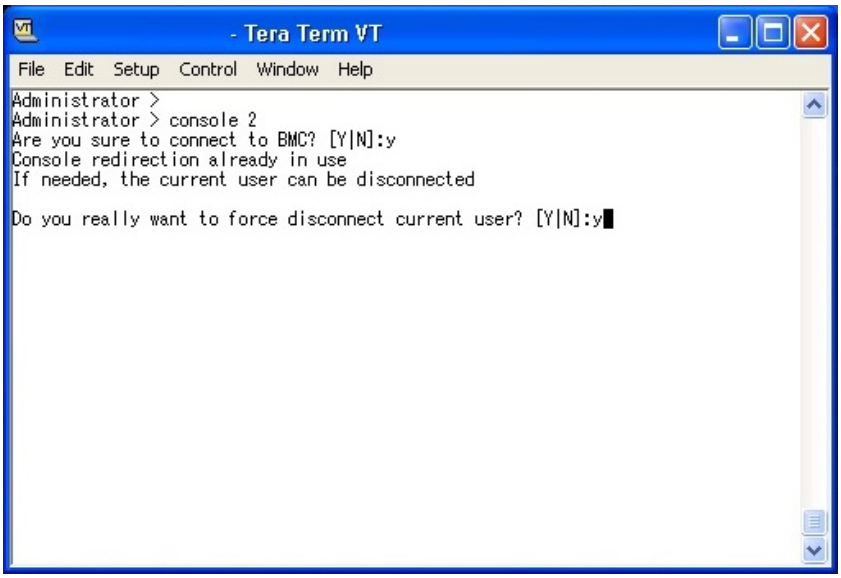
3. If you connect to other partition, perform step 1 and step 2 again after closing current console redirection. To close the console redirection, perform either of below operation:
   - Press [ESC] key and then press [(] key.
   - Press [~] key and then press [.] key.

Forced disconnection of console redirection

Note
Only one user at a time is permitted to use the console redirection function.

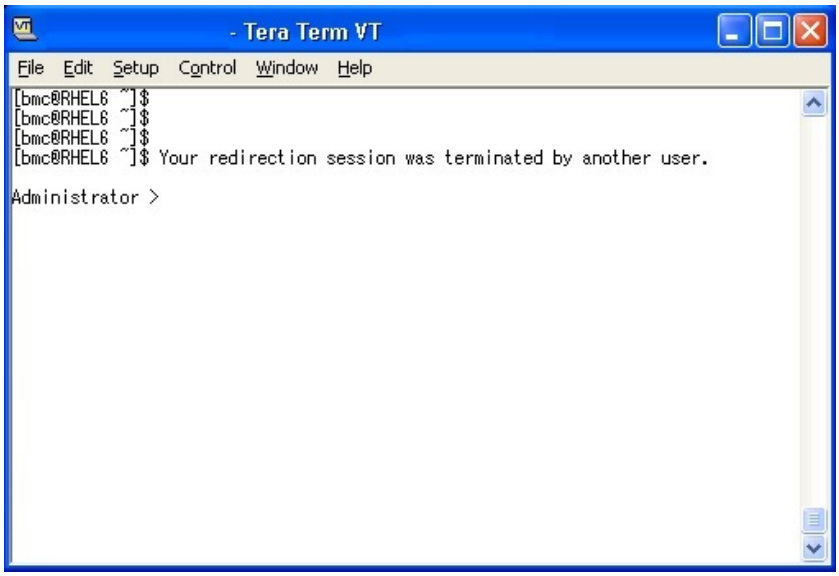
1. If a user attempts to connect using the function while another user is using it, the message "Console Redirection already in use" appears. The window appears as follows.

FIGURE 1.19 Forced disconnection of console redirection (1)


- Tera Term VT
File Edit Setup Control Window Help
Administrator >
Administrator > console 2
Are you sure to connect to BMC? [Y|N]:y
Console redirection already in use
If needed, the current user can be disconnected
Do you really want to force disconnect current user? [Y|N]:y

2. If you disconnect the console redirection of other user who has been already used, enter ‘yes’.
   You can use console redirection in place of current user.
   The terminal software of the disconnected user displays the following window.

FIGURE 1.20 Forced disconnection of console redirection (2)


- Tera Term VT
File Edit Setup Control Window Help
[bmc@RHEL6 ~]$
[bmc@RHEL6 ~]$
[bmc@RHEL6 ~]$
[bmc@RHEL6 ~]$ Your redirection session was terminated by another user.
Administrator >

Virtual Media

The virtual media function enables a partition to share the floppy disk drives, CD or DVD drives, and HDD or USB devices of terminals as storage devices. For ISO images, ISO images on the terminal appear as emulated drives on the partition side.
Up to two devices can be used per each device at the same time. Up to six devices can be used at same time in total.

Note

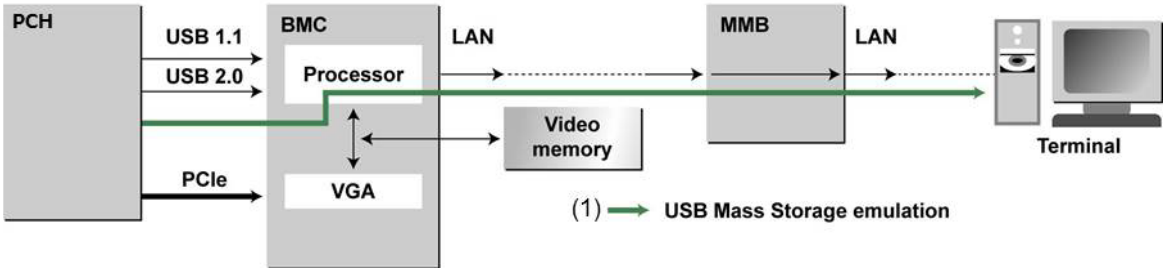
- For a terminal whose operating system is Windows Vista or Windows 7, set UAC (User Account Control) or UAP (User Account Protection) to "Disabled”.
- If the operation terminal is accessing the USB memory by using explorer and so on, the operation terminal does not recognize the USB as a connectable device by virtual media.
- You may receive a STOP error message on a blue screen when using the virtual media function from your terminal.
  The blue screen appears on the terminal under the following circumstances.

- You are using the remote storage function from a terminal running one of the following Windows operating systems:
  - Windows XP
  - Windows Vista
  - Windows 7
  - Windows Server 2008 R2
  - Windows Server 2012
- You are using two USB devices as remote storage devices.

This issue does not occur when only one USB device is used.
Example: One of your remote storage devices is a USB device and the other is an iso image.
If your terminal is running on Windows Vista or Windows Server 2008, you can avoid this issue by applying the hotfix from KB 974711. For details, see the Microsoft Knowledge Base.
If your terminal is running on Windows XP, Windows 7, or Windows Server 2008 R2, use only one USB device.
For more information related to Windows 7 or Windows Server 2008 R2, see the Microsoft Knowledge Base.

The following shows a diagram of the connection configuration for remote storage.

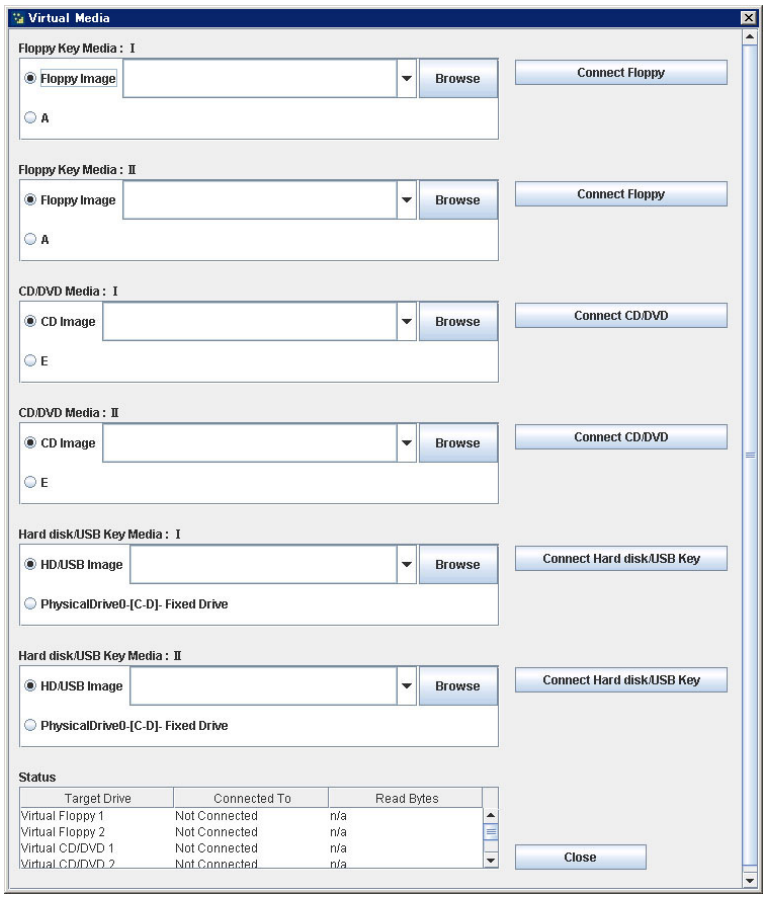
FIGURE 1.21 Configuration of virtual media connection



No.	Description
(1)	USB Mass Storage emulation

To recognize and display the devices that can be connected remotely, select [Virtual Media Wizard…] from the [Media] menu in the [Video Redirection] window. To recognize CD drives and DVD drives as devices that can be connected remotely, the drives must already have media inserted in them.

FIGURE 1.22 [Virtual Media] window (1)



The following lists the buttons available in the virtual media list window.

TABLE 1.12 Buttons in [Virtual Media] window

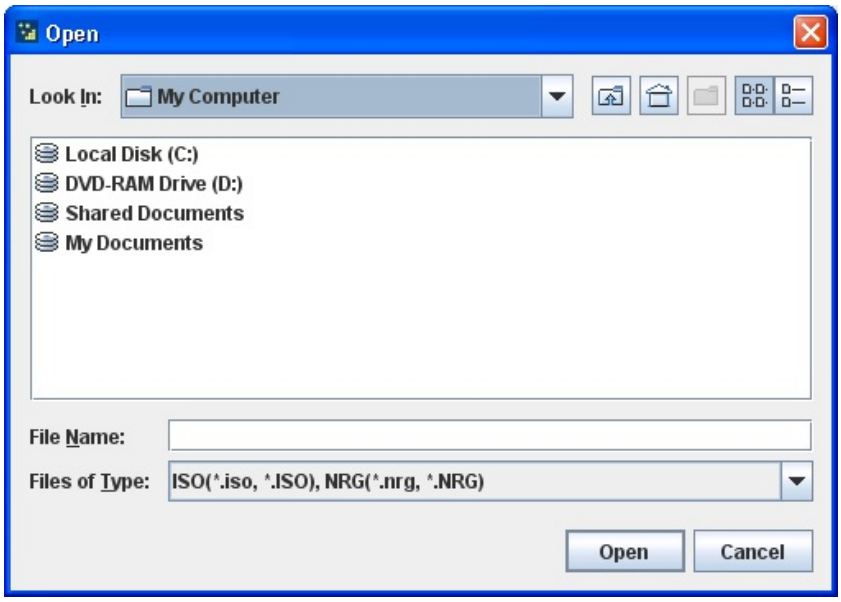
Item	Description
[Browse]	Add image file as virtual media.
[Connect]/[Disconnect]	Connect or disconnect selected device to a partition.
[Close]	Closes this window.

Note

- If you replace media while connecting to virtual media, click [Disconnect] button after setting new media. Click [Connect] again.
- When the [Video Redirection] window closes, all devices are disconnected from the server. Also, the devices are removed from the list.
- If mounting the media selected by virtual media fails when connecting the media, click [Disconnect] button and click [Connect] button again.

Click the [Browse] button to display the image file selection window. From the storage devices on the PC, you can select those to be connected to the partition.

FIGURE 1.23 Image file selection window



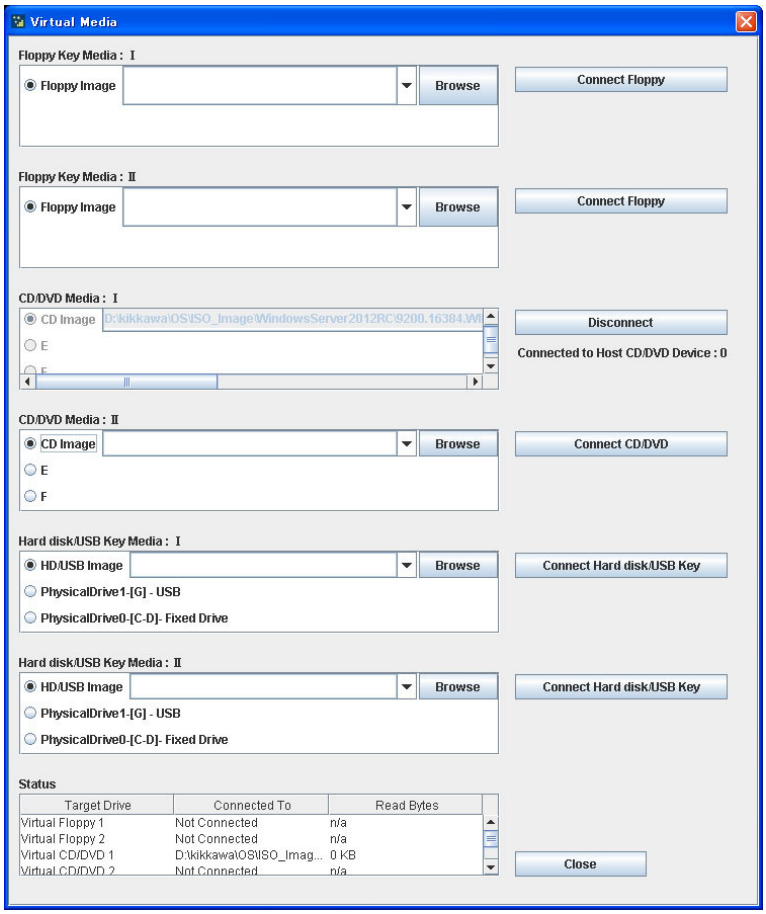
Items in image file selection window are listed below.

TABLE 1.13 Items in image file selection window

Item	Description
Look In	Displays the current search location
File name	Used to enter the device index letter (e.g., E:)
File of type	Used to specify a file type.
Open	Adds the selected device to the list.
Cancel	Closes this window.

Below formats of image can be used for virtual media.
Floppy: ima, img
CD/DVD: nrg, iso
HDD/USB: img
Select the ISO image file, and click the [Select] button. Then, the display returns to the [Virtual Media] window. Click [Connect CD/DVD] button in [Virtual Media] window to register the ISO image to target list of virtual media.

FIGURE 1.24 [Virtual Media] window (2)



Retrying a connection after the Reserved SB is switched

When changing the Home SB of the partition, connect console and video redirection again.

1.6.3 ServerView Suite

ServerView Suite environment setup for Windows

For details on the environmental settings of ServerView Suite for Windows, see the *ServerView Suite ServerView Installation Manager*.

ServerView Suite environment setup for Linux

For details on the environmental settings of ServerView Suite for Linux, see the *ServerView Suite ServerView Installation Manager*.

Creating and managing server groups

For details on how to create and manage server groups for individual users, see the *ServerView Suite ServerView Operations Manager Server Management*.
For more information about ServerView Suite, see below web site.
http://manuals.ts.fujitsu.com/

CHAPTER 2 Operating System Installation (Link)

For details on how to install an operating system on a partition, see Chapter 4 Installing the Operating System and Bundled Software in the PRIMEQUEST 2000 Series Installation Manual.

CHAPTER 3 Component Configuration and Replacement (Add, Remove)

This section describes the configuration and replacement of component of the PRIMEQUEST 2000 series.

3.1 Partition Configuration

This section describes the configuration of the PPAR partition.

- 3.1.1 Partition Configuration (PPAR)

The partition is set in MMB Web-UI.

- 3.1.2 Setting procedure of partition in MMB Web-UI

3.1.1 Partition Configuration (PPAR)

In order to configure and operate a partition, at least one usable SB, and at least one usable IOU are necessary.
During the course the configuration operation, there may be instances where the above conditions are not met (e.g.: partitions without SB); in such cases, the partition cannot be powered on and operated. Partition can be powered on without DU and PCI_Box while these components are necessary for expansion of storage capacity or PCI slots.
Configuration rules for partition are shown below

TABLE 3.1 Configuration rules for partition (components)

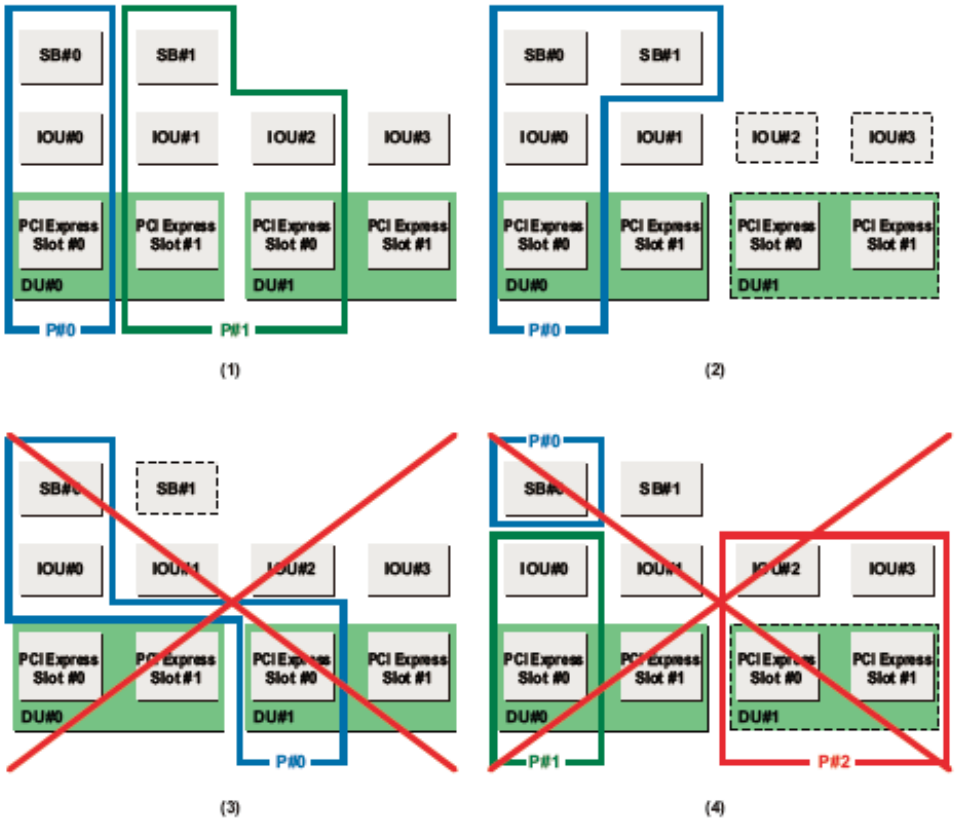
Components	Required number (common for all models)
SB	One or more
IOU	One or more
DU	Optional
PCI_Box	Optional

Regarding DU, it is necessary that IOU containing DU should be possible.
Example:
To use DU#0, the use of IOU#, or IOU#1 should be enabled.
To use DU#1, the use of IOU#2, or IOU#3 should be enabled.
For the installation conditions of the CPU, see ‘Appendix G Component Mounting Conditions’.
A conceptual diagram of PPAR partitioning function for each model is shown below.

PRIMEQUEST 2400E

For PRIMEQUEST2400E, up to two partitions can be configured. An optional SB and an optional IOU can be freely combined. The partition configuration is shown below. Components with dotted line /and white background color in the diagram show the components that are not mounted.

FIGURE 3.1 Conceptual diagram of the partitioning function (PRIMEQUEST 2400E)

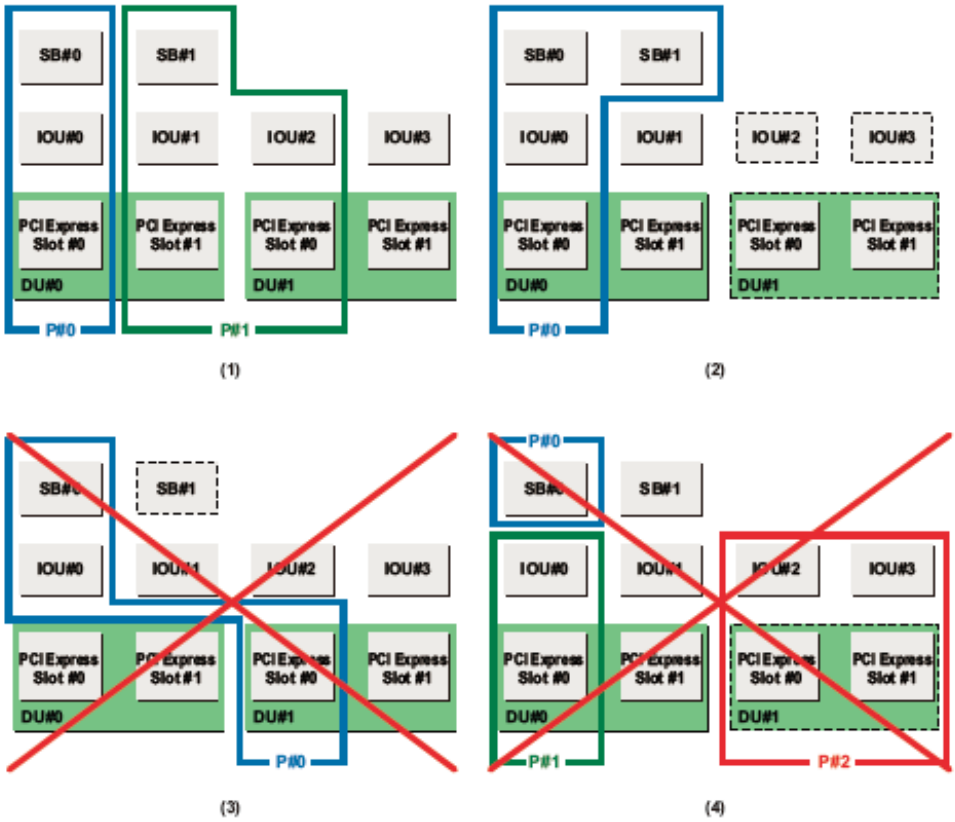


No.	Configuration example	Description
(1)	Partition configuration example (possible)	Example of dividing into two partitions. Partition #1 includes one SB and two IOUs. SBs and IOUs can be freely combined.
(2)	Partition configuration example (possible)	Example of combining two SBs and one IOU.
(3)	Partition configuration example (not possible)	DU #1 cannot be used if IOU #2 or IOU #3 is not included in the partition.
(4)	Partition configuration example (not possible)	No partition can consist of only an SB and IOU.

PRIMEQUEST 2800E

For PRIMEQUEST2800E, up to four partitions can be configured. Optional SB and optional path can be freely combined. Examples of partition configuration are shown below. Components with dotted line and white background in the diagram show the components that are not mounted.

FIGURE 3.2 Conceptual diagram of the partitioning function (PRIMEQUEST 2800E)



No.	Configuration example	Description
(1)	Partition configuration example (possible)	Example of dividing into three partitions. Partition #1 includes one SB and two IOUs. Partition #2 includes one SB and one IOU. SBs and IOUs can be freely combined.
(2)	Partition configuration example (possible)	Example of configuring a partition of two SB and one IOU into two partitions
(3)	Partition configuration example (not possible)	DU #1 cannot be used if IOU #2 and IOU #3 are not included in the partition.
(4)	Partition configuration example (not possible)	No partition can consist of only an SB, and IOU.

3.1.2 Setting procedure of partition in MMB Web-UI

The procedure to set the partition in the MMB Web-UI is described below.

1. Power off the partition.
   For details, see "PRIMEQUEST 2000 series Tools Reference" '1.3.1 [Power Control] window'.
2. Add the SB and IOU into the partition.
   For details, see "PRIMEQUEST 2000 series Tools Reference" '1.3.3 [Partition Configuration] window'.
3. Set the Home SB.
4. If necessary, set a Reserved SB.
   For details, see '1.3.5 [Reserved SB Configuration] window' in "PRIMEQUEST 2000 series Tools Reference".
5. Set the name of the partition.
   For details, see '1.3.3 [Partition Configuration] window' in "PRIMEQUEST 2000 series Tools Reference".
6. Set the various types of modes.
   For details, see the [Mode] window of the '1.3.8 [Partition #x] Menu' in "PRIMEQUEST 2000 series Tools Reference".
7. Power on the partition.
   For details, see '1.3.1 [Power Control] window' in "PRIMEQUEST 2000 series Tools Reference".

3.2 High availability configuration

This section describes the following functions for realizing a high system availability of the PRIMEQUEST 2000 series.

- 3.2.1 Dynamic Reconfiguration (DR)
- 3.2.2 Reserved SB
- 3.2.4 Memory Mirror
- 3.2.5 Hardware RAID
- 3.2.6 Server View RAID

3.2.1 Dynamic Reconfiguration (DR)

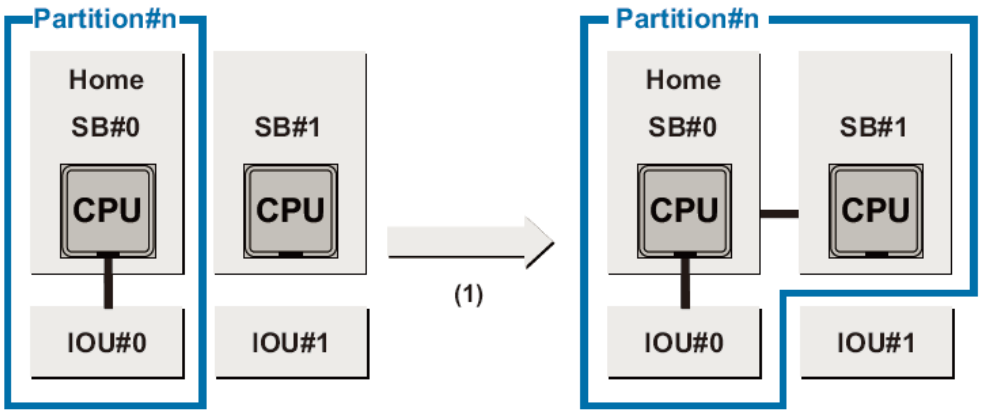
This section describes the hot maintenance by DR.
For details on the hot maintenance, see CHAPTER 4 PCI Card Hot Maintenance in Red Hat Enterprise Linux 6.

Function Overview

The DR function is intended for adding or removing hardware resources, such as CPU, memory and I/O, without stopping the partition system. Units for adding and removal are the partition configuration components of SB and IOU (including the PCI_Box). The DR functions for various configuration elements are as follows.

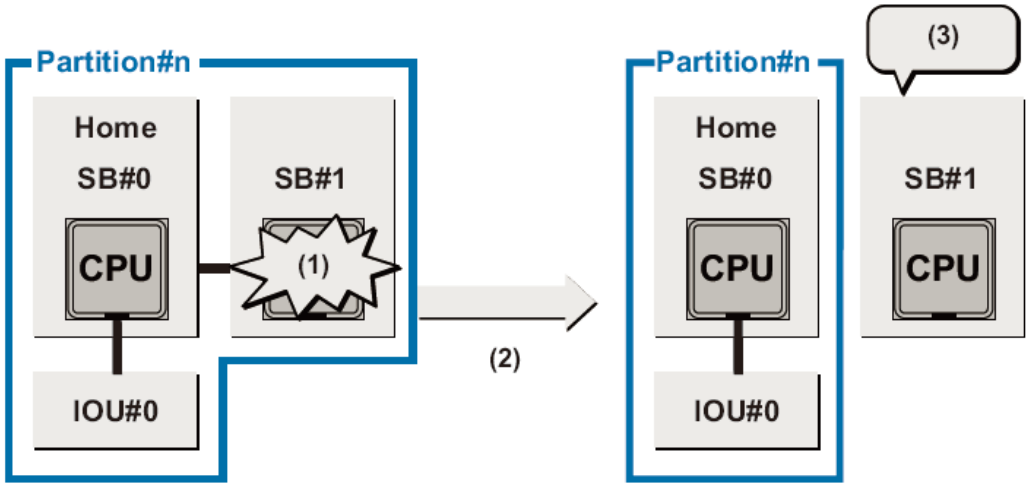
- SB hot maintenance (SB hot add / SB hot remove)
  It is a function for adding the CPU and memory resource to the SB unit without stopping the partition system. The following functions are provided.
  - Enable the expansion of the CPU and the memory resources of a system that is running.
  - Enable the hot maintenance of SB where a suspected fault was detected.
  - Redistribute the SB resources across partitions in accordance with the load.

FIGURE 3.3 SB hotadd



No.	Description
(1)	Dynamic addition of SB (operated by the operator)

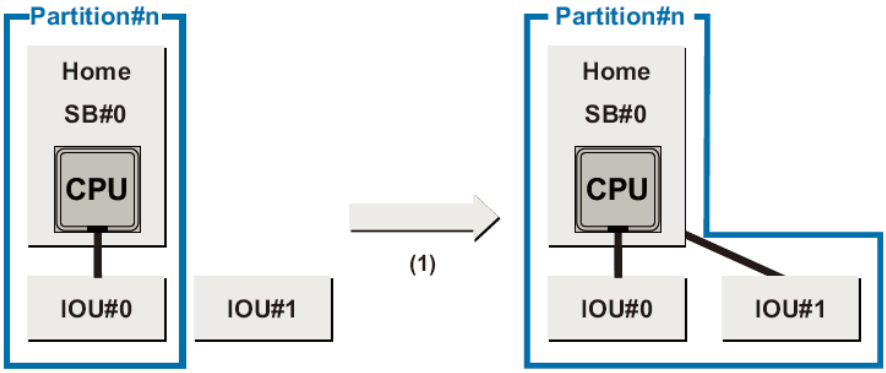
FIGURE 3.4 SB Hot remove (Disconnecting a faulty SB)



No.	Description
(1)	Fault suspected
(2)	Dynamic disconnection of SB (operation by operator)
(3)	Replacement

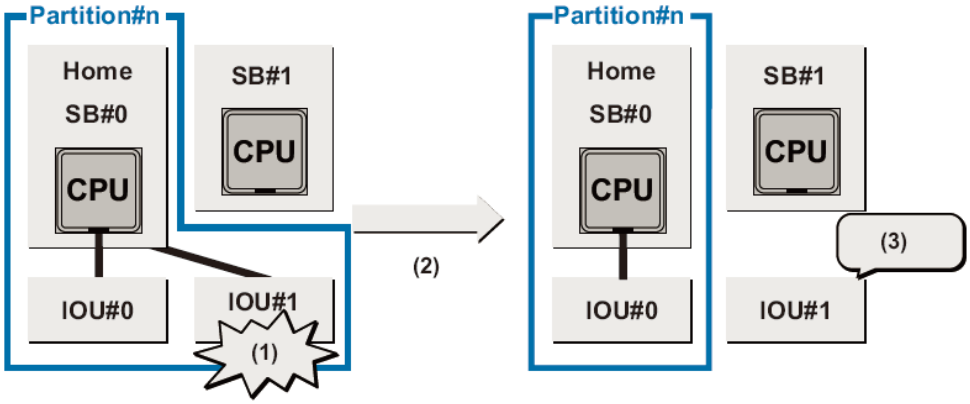
- IOU hot maintenance (IOU hot add/ IOU hot remove)
  Function that can incorporate an IOU into the system (IOU hot add), or disconnect an IOU from the system (IOU hot remove) without restarting the operating system.
  Hot-plug of PCI_Box is not possible. Hot-plug of PCI card on the PCI_Box is possible.
  The following functions are provided.
  - Enabling the I/O resource enhancement (especially the resource enhancement that requires the addition of PCI Express slot) in a running system.
  - Enables the hot-swap of the failed IOU and the pre-failed IOU.
  - Perform a redistribution of IOU resources across partitions in accordance with the load.

FIGURE 3.5 IOU Hot add



No.	Description
(1)	Dynamic addition of IOU (operation by operator)

FIGURE 3.6 IOU hot remove (removal of failed IOU)



No.	Description
(1)	Fault suspected
(2)	Dynamic disconnection of IOU (operator operation)
(3)	Replacement

Rules of DR

The DR is set in the UEFI.
The DR applicable conditions are as follows.

TABLE 3.2 Applicable criteria

Item		Setting / criteria
IO mode		Flexible I/O mode
PCI Address mode		PCI segment mode
SB		At least one SB
CPU		At least one CPU configuration Each CPU must have a separate local memory
Memory (*1)	Home SB	2GB+ (Quantity of Logical CPUs X100MB) + (Memory capacity of the total system x0.03) + Memory capacity of HugeTLB
	Excluding Home SB	Nothing specific
DR Function		Enabled
TXT / TPM Function		Disabled

*1: In case of SB hot add, the SB to be added, should be a Free SB, or a Reserved SB of the target partition.

The target of the DR function and supported operating systems are shown below.

TABLE 3.3 DR supported list

Component	Function	Windows Server Windows 2008 R2 or later	VMware ESXi 5 or later	Red Hat Enterprise Linux RHEL6.4 or later	SUSE Enterprise Linux 11
SB CPU (*2) DIMM (*2)	Hot add	Not supported	Not supported	Supported	Not supported
	Hot remove (*1)	Not supported	Not supported	Not supported	Not supported
	Hot replace	Not supported	Not supported	Not supported	Not supported
IOU	Hot add	Not supported	Not supported	Supported	Not supported
	Hot remove	Not supported	Not supported	Supported	Not supported
	Hot replace	Not supported	Not supported	Supported	Not supported
PCI_Box (*3)	Hot add	Not supported	Not supported	Supported	Not supported
	Hot remove	Not supported	Not supported	Supported	Not supported
	Hot replace	Not supported	Not supported	Supported	Not supported

*1: Hot remove of SB not possible.
*2: Physical replacement of CPU and DIMM as hardware is not possible. When replacing the CPU and the DIMM, the SB is removed by the hot remove of SB. Or the partition is stopped.
*3: DR function of PCI_Box is operated with DR function of IOU.

How to check the dp command package

Execute the following command, and check whether the dp command package has been installed.
rpm –qa | grep FJSVdp-util

Example:

```
# rpm -qa | grep FJSVdp-util
FJSVdp-util-RHEL6-1.0.0-1.noarch
```

In case it has not been installed, see 4.1 Dynamic Reconfiguration (DR).

Type of memory in DR

There are three types of memory of DR, shown below, depending on the conditions of use.

- Kernel memory
  It is the memory internally used by the operating system. The kernel memory cannot be disconnected from the system by SB hot-plug operation. It is secured from the memory of the Home SB at startup
- User memory
  If is a memory in which the kernel memory is not loaded, the user memory can be hot-removed from the system by the SB hot plug operation.
- Special memory
  It is a hugetlbfs special memory. hugetlbfs cannot be disconnected from the system by SB hot plug operation. Therefore, this memory is present only on the Home SB.

Notes / Limitations

- All the SB firmware shall be of the same version number.
- The added SB and CPU have same product name in the partition.
- Kernel memory is present only in the Home SB. Therefore, hot remove of Home SB is not supported.
- The Home SB cannot be changed to another SB while the partition is running.
- The DR function (hot add/ hot remove) is manually operated using the DR operation of the MMB command of the command interface (CLI). There will be no automatic processing in conjunction with proactive monitoring. DR operation is not possible in the maintenance mode.
- When using the DR function, the same type of DIMMs must be arranged in the system. Even in case of SB hot add, the DIMM to be added must be the same type of DIMM.
- When increasing the number of CPUs in a DR operation (hot add), additional CPU licenses must be purchased for the software that is running in the relevant partition.
- Two CPUs must be mounted on the SB intended for hot add.
- Two CPUs must be mounted on SBs in the partition where SB hot add is intended to be performed.

- For the partition with DR mode enable, memory size within PPAR must be 1TB or less.
  When hot adding SB, total memory size within the PPAR must be 1TB or less after adding a SB.
- Do not perform DR operation when high load is applied to the partition since TIMEOUT may occur if DR operation is performed when high load is applied to the partition.
- In case you intend to perform hot add of SB or IOU, DR operation will not be possible if there is a warning or error in the SB or IOU to be added.
- The TSC (Time Stamp Counter) of added SB by SB hot add does not synchronize with the running system.
- The settings of the Reserved SB are deleted after the Reserved SB is incorporated into the partition by hot add.
- In case of hot remove of the Reserved SB that belongs to a partition, the Reserved SB setting is not canceled.
- DR operation (SB hot add, SB hot remove, IOU hot add, IOU hot remove, hot add of PCI Express card or hot remove of PCI Express card) can't be performed in parallel at the same time in the chassis. .
- SB hot add or SB hot remove operation cannot be specified at the same time for multiple SBs.
- DR operation cannot be performed on the EFI Shell.
- The DR operation takes several minutes, and the execution cannot be canceled.
- When DR is enabled, a HDD/SSD on the non-Home SB cannot be used.
- In case of hot addition of SB with the memory mirror mechanism enabled, the DR operation may fail if the SB to be added does not meet the mirror mode setting conditions of the target partition.
- The sadump function does not work during the SB hot plug operation.
- Do not perform DR operation to a component mounting dump device or a component which is connected to dump device.
- If hot remove of SB is implemented when allocating a process to a specific CPU using CPU binding, the relevant process will be moved to another CPU which is not intended.
- For IOU hot remove, the kdump or sadump will not function if an IOU having a kdump disk or a sadump disk is removed.
- When executing the DR in a cluster configuration, the execution is performed after disconnecting the relevant machine from the cluster group. For details, see ‘PRIMECLUSTER Installation and Administration Guide’ (J2UZ-5274-08Z0).
- If power control such as power off, reset and power cycle or error occurs during SB hot add, partition configuration differs depending on whether test phase process, which is check process of SB prior to SB add process, is completed or not.
  - If test phase process is not completed, partition configuration is the same one as before SB hot add. The partition does not include an added SB.
- If test phase process is completed, partition configuration changes to the configuration specified by DR operation. The partition includes not only current SBs but also an added SB.
- Hot add or hot remove of an IOU which is connected a DU cannot be performed.
- DR operation cannot be performed if memory operation mode is Performance mode.
- Error of IO and memory cannot be sometime detected during SB hot add and SB hot remove.
- Legacy OS cannot be started up since a partition with DR mode enabled forcibly starts up in UEFI mode. If you start up Legacy OS, disable DR mode.
- For IOU hot add or IOU hot replacement, PCI bus address which is allocated to PCI device on relevant IOU just after IOU hot add or replacement may differ at next partition boot.
- Error of added IO may not be detected during hot adding an IOU.
- Do not enable DR function and TXT/TPM function together.

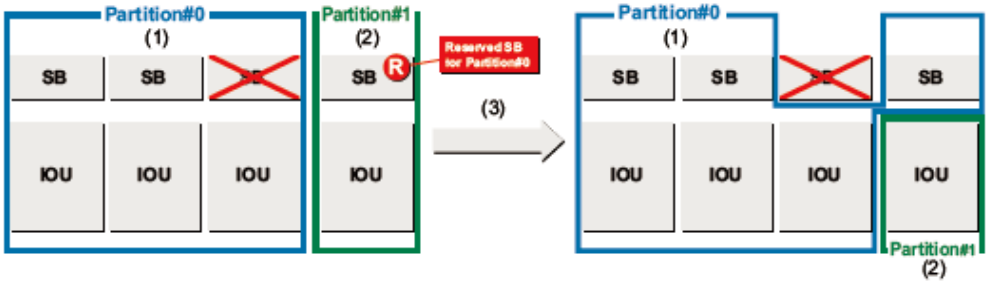
3.2.2 Reserved SB

In the Reserved SB function, a spare SB is mounted in the chassis in advance, the faulty SB is automatically disconnected, the spare SB is incorporated and the partition is restarted. The spare SB intended for switching when there is a fault is called the Reserved SB. All models in the PRIMEQUEST2000 series support the Reserved SB function.
Using a Reserved SB function has the following advantages when a hardware error occurs in the SB.

- Quick recovery is possible without reduction in SB resources.
- In a partition with one SB, recovery is possible even if the SB fails (SB degradation)

In addition, in the 2000 series PRIMEQUEST Series, SB in a running partition can be also specified as a Reserved SB. A Reserved SB can be used very effectively by using this function.
An SB in a running partition can be also used as a Reserved SB. In this case, the SB will be referred to as Active Reserved SB.
The example below shows the operation wherein the SB of a partition in the test system being used as a Reserved SB.
If there is an SB failure in a partition of the production system, the firmware issues a shutdown instruction to the partition of the test system. After the shutdown is completed, the partition is incorporated as the SB of the production system. However, this setting is applicable only if the shutdown time of the test system can be permitted.

FIGURE 3.19 Example of operation of a partition of a test system using the SB as a Reserved SB



No.	Description
(1)	Production system
(2)	Test system
(3)	Partition #1 is shutdown

Remarks

- Reserved SB is used in case of hardware failure. The cause of switching to the Reserved SB from the memory dump report cannot be determined. See the system event log of the MMB to find out the cause of switching to the Reserved SB. The memory dump information is used for determining software failures.
- In a Windows installed partition, restart is prompted at the first startup, after switching to the Reserved SB. Restart is done following instructions.
- In a Windows installed partition, when the operation is stopped during an SB failure, the time taken for restarting has to be considered. The total time taken for two restarts, the reboot time and the time it takes for the first startup after switching to the Reserved SB will be required. Besides, restart can be carried out once, at the first startup when there is a failure, by implementing workaround in advance. For details on the workaround, see '● Procedure to prevent Windows restart' of '3.4.3 Reserved SB Setting' in "PRIMEQUEST 2000 series Installation Manual" (C122-E174)

Reserved SB definition

The definition of the Reserved SB is automatically canceled after the Reserved SB operates.
Note
When restoring during maintenance after the Reserved SB operation, replace the faulty unit and reset the Reserved SB information from the Web-UI.

Reserved SB Setting Rules

The Reserved SB setting criteria are as follows.

- Any SB not belonging to the own partition can be set as a Reserved SB

- An SB can be set as a Reserved SB for multiple partitions.
- Multiple Reserved SBs can be set for a single partition.
- If a partition is configured by a single SB, the CPU and DIMM of the Reserved SB must comply with the installation rules in the Reserved SB. (*1)
- Two CPUs must be mounted on a Reserved SB.
- If a partition is configured by multiple SBs, only the SB with the DIMM configuration that meets the mounting order of the Memory Operation Mode, which is the same as the source SB, can be set as a Reserved SB.
- If a partition is configured by multiple SBs, only the SB that meets criteria for mixing the CPUs with the partition can be set as the Reserved SB.
- If a partition is configured by multiple SBs, only the SB that meets the conditions for mixing DIMM with the partition can be set as the Reserved SB.
- The SB that is set as the Reserved SB, is set from the MMB Web-UI, and can be incorporated in an arbitrary partition. At that time, the Reserved SB settings for the incorporated destination partition will be canceled. The Reserved SB settings for other partitions will be continued.

*1: If a partition is configured of one SB, the Source SB is disconnected from the partition by Reserved SB switching. Therefore, there is no need to consider the DIMM and CPU mixing criteria between the Reserved SB and the source SB. There may be one or two CPUs for a Reserved SB. The Reserved SB need not consider Yes/No for Memory Mirroring / Sparing. However, if the DIMM configuration of the Reserved SB is different from the switching source SB, the Memory Operation Mode may change after switching to the Reserved SB switching may change from the Memory Operation Mode of the source SB. Specific changes in the Memory Operation Mode before and after Reserved SB are shown below.

TABLE 3.4 Memory Operation Mode before and after Reserved SB switching, when a partition is configured from one SB.

Source SB Memory Operation Mode	SB DIMM configuration for Reserved SB	Memory Operation Mode after Reserved SB switching
Mirror	Normal	Normal
	Mirror	Mirror
	Spare	Spare
	Normal or Mirror (*1)	Normal
	Normal or Mirror or Spare (*2)	Normal
Mirror	Normal	Normal
	Mirror	Mirror
	Spare	Spare
	Normal or Mirror (*1)	Mirror
	Normal or Mirror or Spare (*2)	Mirror
Spare	Normal	Normal
	Mirror	Mirror
	Spare	Spare
	Normal or Mirror (*1)	Normal
	Normal or Mirror or Spare (*2)	Spare

*1: DIMM configuration wherein both the Normal Mode and the Mirror Mode can be set. In case of one CPU, 8, 16 or 24 DIMMs are mounted, and in case of two CPUs, 16, 32 or 48 DIMMs are mounted.
*2: DIMM configuration wherein the Normal Mode, the Mirror Mode and the Spare Mode can be set. In case of one CPU, 24 DIMMs are mounted, and in case of two CPUs, 48 DIMMs are mounted.

Notes on Windows

The operating system may not start at the first startup after an SB is switched to the Reserved SB in a partition running Windows. Set Windows to automatically restart to set the Reserved SB in the partition running Windows.
For details on the setting, see‘11.4.3 Dump environment setting (Windows) ’, and check the [Automatically restart] check box of ‘FIGURE11.14 [Startup and Recovery] dialog box’.
Consider the time taken to restart, if the SB failure results in the suspension of work for the above stated reason. The restart will require twice the length of the time, since a restart is needed after the switching to the Reserved SB and the subsequent initial startup.
However, the following workaround can suppress the restart request.

Workaround for Windows restart

In the PRIMEQUEST 2000 series, the restart request can be suppressed by identifying the Reserved SB in advance.
Execute the following procedures for all the partitions with Windows installed.
When these workaround steps are executed, restart is not requested when there is a switching to the Reserved SB due to SB failure.

1. Shutdown the partition after completing the installation of Windows.
2. Remove one SB from the partition by using the MMB Web-UI. When there are multiple SBs, any SB can be removed.
   For details, see 'Removal of SB and IOU' of' 3.4.1 Partition Configuration Setting' in "PRIMEQUEST 2000 series Installation Manual" (C122-E174).
3. Add the SB of the Reserved SB to the partition.
   For details, see 'Adding an SB/IOU' of 3.4.1 Partition Configuration Setting' in "PRIMEQUEST 2000 series Installation Manual" (C122-E174).
4. Power on the partition and start the Windows.
5. Log in with Administrator privilege. After the message that the system must be restarted is displayed on the window, follow the instructions and restart the system.
6. Shutdown the system after restarting the Windows has been completed.
7. Using the MMB Web-UI, remove the SB of the Reserved SB, which was added in Step 3.
8. Add the SB removed in Step 2, to the partition.

Notes on VMware

When there is a switching to the Reserved SB in the partition running VMware, the guest operating system may not start at the first restart after the switch over.
Set the guest operating system to automatically restart, and the Blue Window Timeout items when setting Reserved SB in a partition running VMware.
For details on the setting, see the VMware Manual.

Switching rules

Switching rules for the Reserved SB are as follows.

- Determining the switching source SB
- When an SB has been configured as a Reserved SB for multiple partitions, and there is simultaneous failure in multiple partitions, the partition with the lowest number takes priority for switching (Example 1).
- When multiple SBs fail in a partition, the SB with the lowest number takes priority for switching (Example 2). Determining the switching destination SB
- When multiple Reserved SBs have been sent in a partition, and there are Reserved SBs that do not belong to any partition, the Reserved SB having the highest SB number takes priority for switching (Example 3).
- When multiple Reserved SBs are set in a partition, and there are only Reserved SBs included in the partition, the Reserved SB having the highest SB number in a powered off partition takes priority for switching (Example 4). If all the partitions are powered on, the Reserved SB with the highest SB number takes priority for switching (Example 5).

FIGURE 3.7 Example 1-a. Example where two SBs are set as Reserved SBs in two partitions (when SB #0 and SB #1 have simultaneously failed)

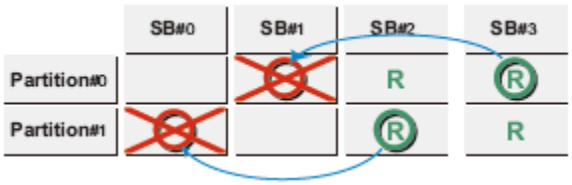
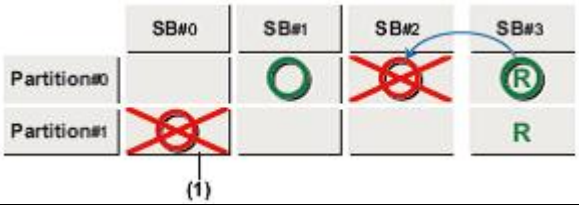


FIGURE 3.8 Example 1-b.Example when one SB is set as the Reserved SB in two partitions (SB #0 and SB #2 have simultaneously failed)

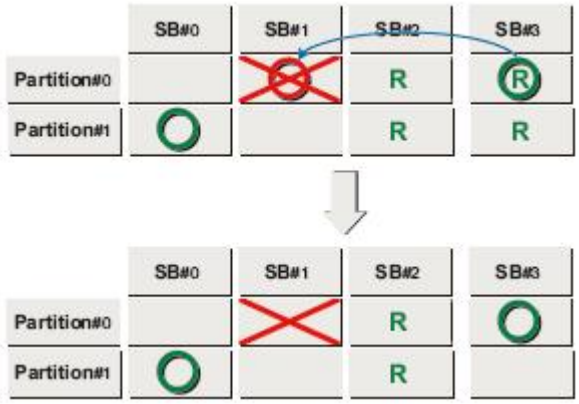


No.	Description
(1)	No switching to the Reserved SB

FIGURE 3.22 Example 2. When multiple SBs have failed within a partition

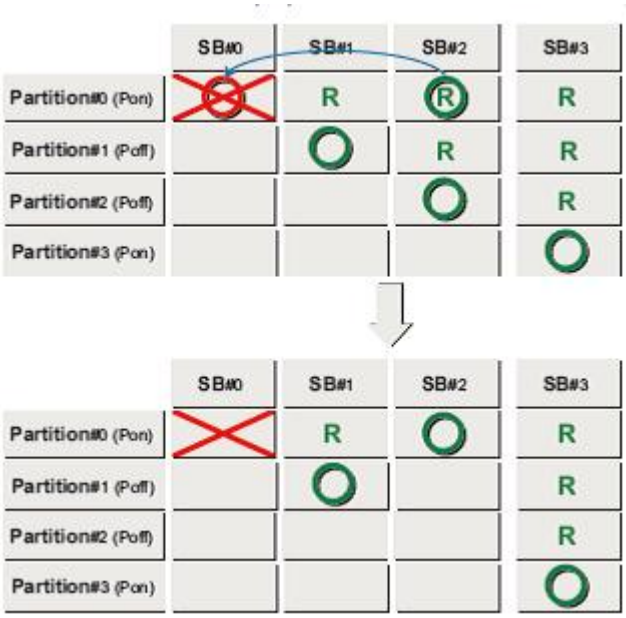
No.	Description
(1)	No switching to the Reserved SB

FIGURE 3.9 Example 3. Example when multiple free SB (#2,#3) is set as Reserved SBs in Partition #0



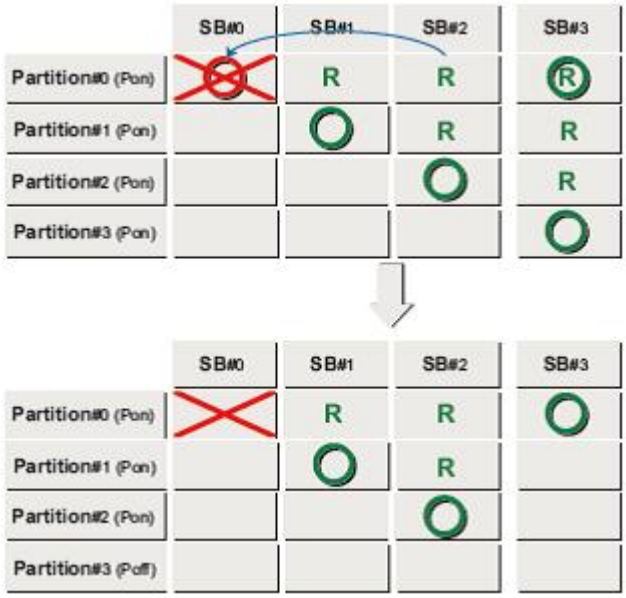
In example 4, since SB #1 and SB #2 of a powered off partition are available, the SB with the highest number is selected as the switching destination.

FIGURE 3.10 Example 4. where Reserved SBs (#1, #2, #3) of Partition #0 belong to other partitions



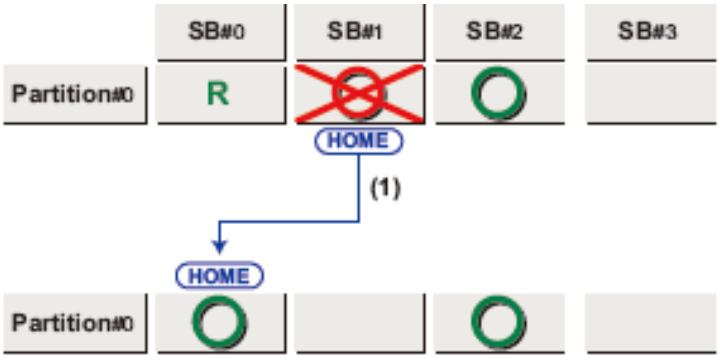
In example 5, since the is no SB in a powered off partition , among SB #1, SB #2, and SB #3 in the powered-on partitions, SB #3 having the highest SB number is selected as the switching destination.

FIGURE 3.11 Example 5. Example where the Reserved SBs (#1, #2, #3) of Partition #0 belong to other partitions



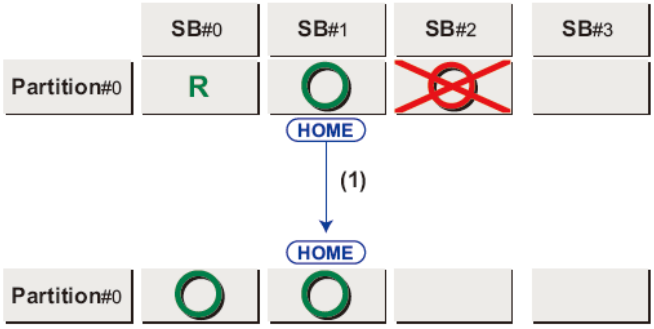
Description of handling the Home SB when switching to the Reserved SB is as follows.
When the Home SB is switched to the Reserved SB, the SB, including the Reserved SB, having the lowest SB number is made as the Home SB (Example 6).
The Home SB does not change if an SB which is not the Home SB is degraded (Example 7).

FIGURE 3.12 Example 6. Example where a Reserved SB has been set in SB #0 (When the Home SB has failed)



No.	Description
(1)	Since Partition #0 is the configuration of SB #0 and SB #2, SB #0 with the lowest number becomes the Home SB.

FIGURE 3.13 Example 7. Example when SB #0 is set as the Reserved SB (when an SB other than the Home SB fails)



No.	Description
(1)	The Home SB does not change when an SB other than the Home fails.

Switching policy

The triggers for switching to a Reserved SB are as follows.
Furthermore, the timing for switching to the Reserved SB is when the partition is started up.
This section describes the conditions (triggers) for switching to the Reserved SB when the partition is started up.

- SB degradation
- DIMM degradation (even in a single DIMM degradation)
- When a Memory Mirror collapse is detected
- When a QPI Lane degradation is detected
- When an SMI2 Lane switching to is detected
- When a PCI Express Lane/Speed degradation on a SB is detected
- When a CPU core degradation is detected

Remarks
Set a value which is not 0 in [Number of Restart Tries] of the [ASR Control] window, as the frequency of automatic partition restart for switching to the Reserved SB.
For details on the [ASR Control] window, see 8.4 Automatic Partition Restart Conditions.

Active Reserved SB switching process

The process of switching of the Active Reserved SB (*1) is described in this section.

*1: SB which is incorporated in a partition, and is also set as the Reserved SB in another partition.

- When the partition that incorporates the Reserved SB is powered off, the corresponding SB will be disconnected.
- When the partition that incorporates the Reserved SB is powered on, the firmware instructs power off for the corresponding partition.
  However, as cases in where the partition is not powered off have been assumed, if a partition is not powered off after the firmware has instructed power off for a partition, and the forced shutdown time has lapsed, Force Power Off is issued, the power of the partition is forcefully disconnected, and the corresponding SB is disconnected. The forced shutdown time of 0～99 minutes can be set from the MMB Web-UI.
- When SBs have been set as Reserved SB in multiple partitions, after being disconnected as a Reserved SB, the Reserved SB for other partitions will be automatically removed.

Limitations of Reserved SB function

The function of the Reserved SB has the following limitations.

- When the I/O device is connected to the USB port or VGA port of the Home SB, and the Home SB switches to the Reserved SB, the connected I/O device must be manually reconnected.
- The system must be restarted during Reserved SB switching.
- Set the Reserved SB according to the partition priority.
  Do not set mutual loops although it can be done under the configuration rules.
- When the memory capacity is reduced after switching to a Reserved SB, confirm that the decreased capacity has to be within the permissible range for applications.
- The shutdown wait time for switching to a Reserved SB being used by another partition is the value that is set from the MMB Web-UI (0 to 99 minutes); the default is 10 minutes. One shutdown wait time can be set in the system (in the chassis). If the shutdown is completed before the specified time elapses, the switching starts immediately. Set only when the switching time is acceptable.
- When using a Reserved SB, it is required that time is taken over after switching to Reserved SB. be sure to use the NTP function to synchronize the time after switching.
  There are two way how to take over the time. One is to synchronize the time to NTP server and the other is to update the time periodically by operating system before Reserved SB switching.

  The way how to synchronize the time to NTP server is shown below.

  - When using Linux, do not specify NTPDATE_OPTIONS =_“-B" in etc/sysconfig/ntpd file in the NTP setting.
  - When using the Windows Server in a workgroup environment, execute the following procedures.

    1. Set the NTP using the [Date and Time] or w32tm command of the control panel.
       Example：w32tm/config/manualpeerlist:<time synchronization destination>
       For details, see Help by executing the w32tm/? command.
    2. Start [Server Manager] from the task bar.
    3. Select [Configuration]-[Services].
    4. From the service list, right click [Windows Time] and select [Properties].
    5. Specify [Auto (Delayed start)] as [Startup Type] of the [General] tab.
    6. Click the [OK] button and close the dialog box.

  - When using the VMware, use the NTP function of the guest operating system (Windows or Linux).
  - When using the NTP function of the guest operating system (Windows or Linux), comply with the above rules.

  The way how to update the time periodically by operating system before Reserved SB switching is shown below

  - If Red Hat Enterprise Linux runs on the partition, the time can be taken over by issuing hwclock --systohc command periodically after Reserved SB switching.
  - If Windows Server or VMware ESXi runs on the partition, any setting on OS is not needed.

- When using the Trusted Platform Module (TPM) function, the Reserved SB function cannot be used.
- Do not set a Reserved SB for a partition where the HDD/SSD on the SB is used as a boot disk or data disk.
- When simultaneously using the Software RAID and the Reserved SB function, do not configure the HDD/SSD Mirror in the SB.

Home SB switching method

When the Home SB fails, the method of taking over the information of the various settings when switching to Reserved SB is as follows.

Note

License authentication may be prompted after the switch to the Reserved SB, when using the volume license or package product, and the SB purchased at the same time as the enable kit is not being used.

TABLE 3.5 Operational restrictions when switching to a Reserved SB

Item	Operational restrictions
USB port	When connected to a USB port, the connection to the USB port of the Reserved SB must be changed manually after the switching.
VGA port	When connected to a VGA port, the connection to the VGA port of the Reserved SB must be changed manually after the switching.
Time setting	If the NTP is not used, operating system time must be verified and set, as there may be a time difference time after the switching.

Remarks

License authentication may be prompted after switching to a Reserved SB in the following cases.

- -When using a volume license or package product
- When using an SB purchased together with the enable kit

For details, see License Authentication with SB and Enable kit Combinations in 3.4 Expansion of components.

3.2.3 Memory Operation Mode

The Memory Operation Mode can be set from the MMB Web-UI for each PPAR partition. The following five modes are supported as Memory Operation Modes.

- Performance Mode
- Normal Mode
- Partial Mirror Mode
- Full Mirror Mode
- Spare Mode

The default is Normal Mode.
The overview of each mode is given the TABLE below.

TABLE 3.6 Overview of Memory Operation Modes

Memory Operation Mode	Description
Performance Mode	Mode that elicits the maximum memory performance. However, it does not support any RAS function except the SDDC.
Normal Mode	Mode in which the Memory Mirror and Memory Spare are used. DDDC is supported as a memory RAS function in addition to SDDC. Mode which is set as the default.
Full Mirror Mode	Mode in which the Memory Mirror is used in all the SBs included in a partition. In this mode, mirror maintenance mode or the capacity maintenance mode is selected as the Memory Mirror RAS mode. For details on the Memory Mirror, see 3.2.4 Memory Mirror. For details on the Memory Mirror RAS, see Memory Mirror RAS of 3.2.4 Memory Mirror.
Partial Mirror Mode	The Memory Mirror mode is used only in the Home SB. In this mode, mirror maintenance mode or capacity maintenance mode is selected as the Memory Mirror RAS mode. For details on the Memory Mirror, see 3.2.4 Memory Mirror. For details on the Memory Mirror RAS, see Memory Mirror RAS of 3.2.4

Memory Operation Mode	Description
	Memory Mirror.
Spare Mode	Mode in which the Memory Spare is used. **Note** The Memory Spare cannot be used when the Memory Mirror has been set.

3.2.4 Memory Mirror

In the PRIMEQUEST 2000 series, the Mirror Mode and the Partial Mirror Mode are supported as the memory mirror, in which the function with the CPU is used. Full Mirror/Partial Mirror can be selected from the MMB Web-UI.

TABLE 3.7 Memory Mirror Mode

Mirror type	Description
Full Mirror	Memory Mirroring is executed in each CPU for all SBs included in a partition.
Partial Mirror (*1)	Memory Mirroring is executed in each CPU, only for the Home SB included in a partition. Memory Mirroring is not executed for an SB which is not the Home SB.

*1: The operation of both Full Mirroring and Partial Mirroring is the same, when the partition is configured by one SB.

Note

When configuring the partition with one SB, the Memory Mirror may be deleted before and after the Reserved SB, depending on the SB DIMM configuration of the Reserved SB. For details, Reserved SB setting rules of 3.2.2 Reserved SB.

Memory Mirror RAS

This section describes the operation when there is an error in the DIMM in the Memory Mirror status.

- The Memory operation when using the Memory Mirror is selected from the MMB Web-UI.
- Mirror maintenance mode (the default)
  When restarting the partition, the failed DIMM and the paired DIMM are not incorporated. The other normal DIMMs will maintain the Memory Mirror.
  - The Memory Mirror status will be maintained because only the normal DIMM would be used.
  - Since the DIMM area suspected to have failed will be degraded, the memory capacity seen from the operating system will be reduced.
- Memory capacity maintenance mode
  The Memory Mirror status of the memory mirror group in which the memory suspected to have failed will be deleted after the partition is restarted. Up to six The DIMM (DIMM with the same NN number as the DIMM#NNM), including the failure suspected memory are not incorporated. The memory mirror group maintains the status of the Memory Mirror.

For details on the memory mirror group, see 'TABLE 3.8 Memory mirror group'.

TABLE 3.8 Memory mirror group

Memory mirror group 1	Memory mirror group 2	Memory mirror group 3	Memory mirror group 4
DIMM#0A0	DIMM#0C0	DIMM#1A0	DIMM#1C0
DIMM#0A1	DIMM#0C1	DIMM#1A1	DIMM#1C1
DIMM#0A2	DIMM#0C2	DIMM#1A2	DIMM#1C2
DIMM#0A3	DIMM#0C3	DIMM#1A3	DIMM#1C3
DIMM#0A4	DIMM#0C4	DIMM#1A4	DIMM#1C4
DIMM#0A5	DIMM#0C5	DIMM#1A5	DIMM#1C5
DIMM#0B0	DIMM#0D0	DIMM#1B0	DIMM#1D0
DIMM#0B1	DIMM#0D1	DIMM#1B1	DIMM#1D1
DIMM#0B2	DIMM#0D2	DIMM#1B2	DIMM#1D2
DIMM#0B3	DIMM#0D3	DIMM#1B3	DIMM#1D3
DIMM#0B4	DIMM#0D4	DIMM#1B4	DIMM#1D4
DIMM#0B5	DIMM#0D5	DIMM#1B5	DIMM#1D5

- Since the memory mirror group having a failure suspected DIMM operates in the Non Mirror, the status would be Partial Memory Mirror.

- Since half the number of DIMMs having a failure suspected DIMM in a Partial Mirrored memory group will not be incorporated, the memory capacity seen from the operating system will be maintained.

The memory incorporation status before and after a partition restart is shown below.

FIGURE 3.14 Status when there is an error in the memory (mirror maintenance mode)

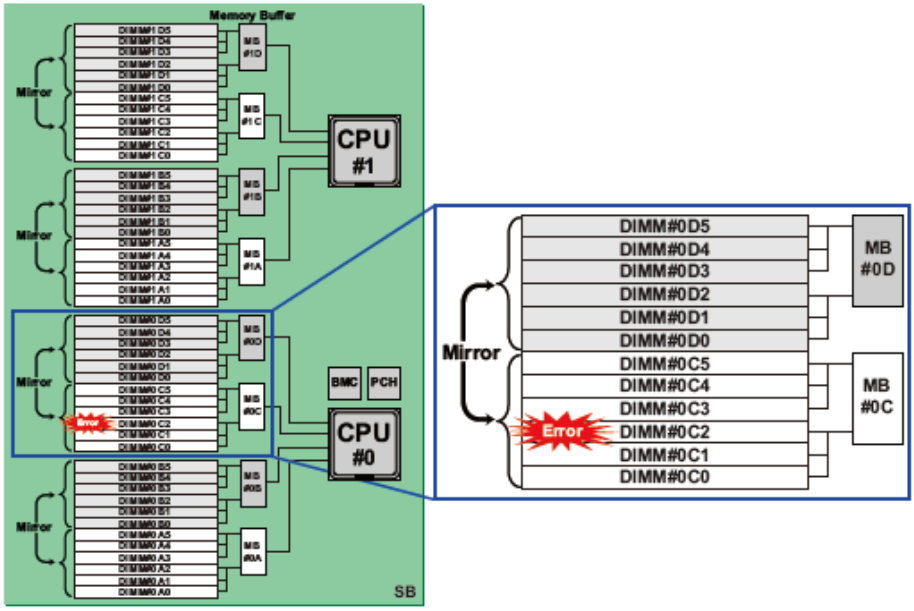


FIGURE 3.15 Status when the error had occurred in the system was restarted (mirror maintenance mode)

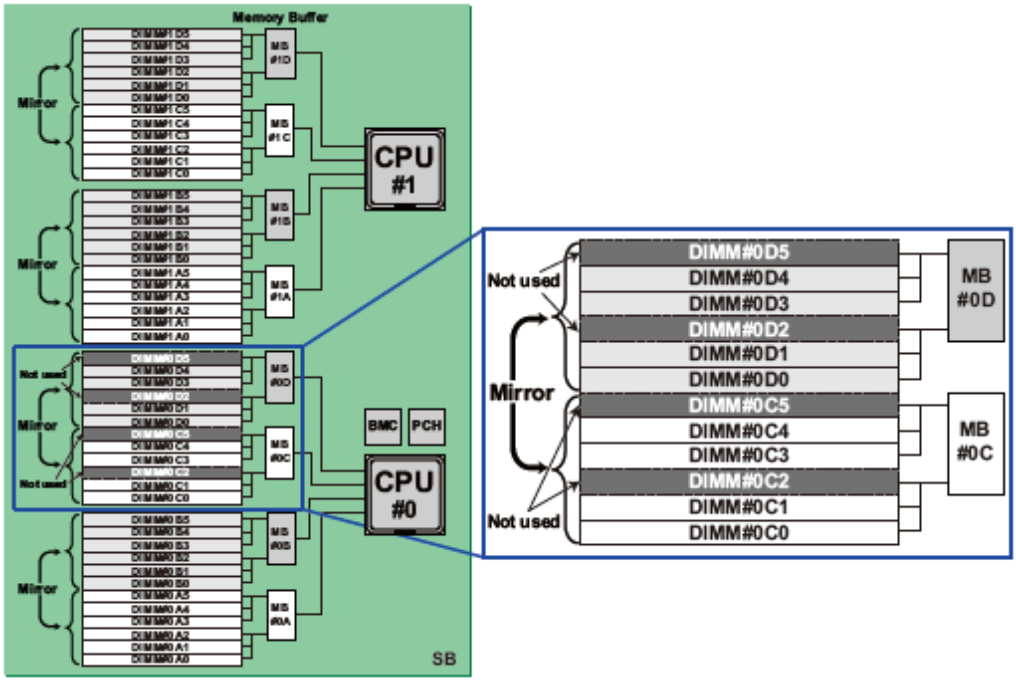


FIGURE 3.16 Status when there error has occurred in the memory (memory capacity maintenance mode)

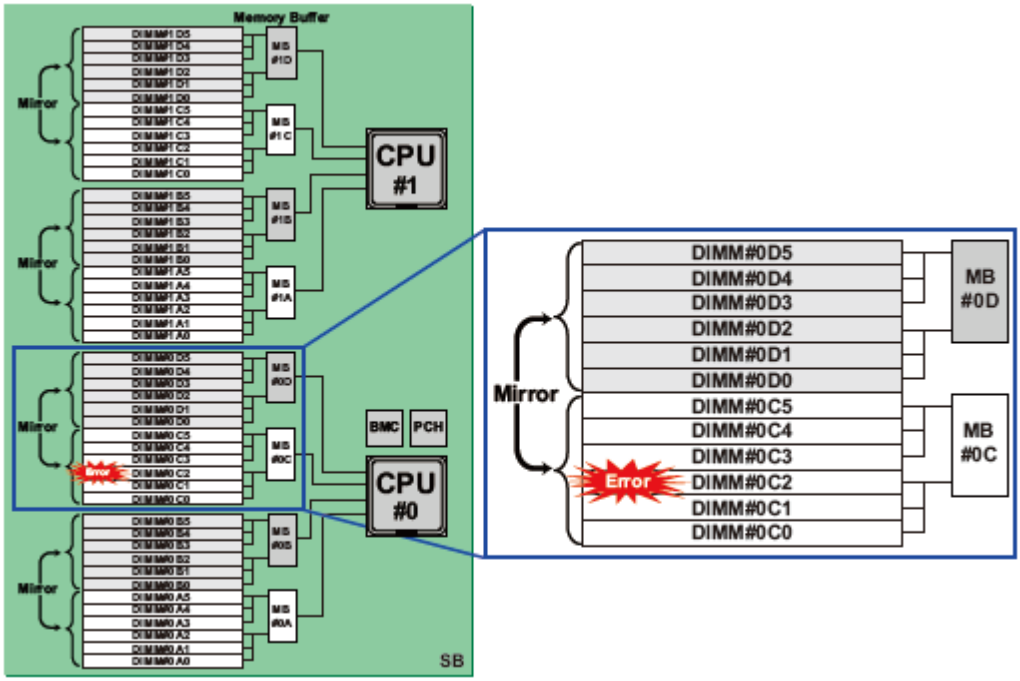
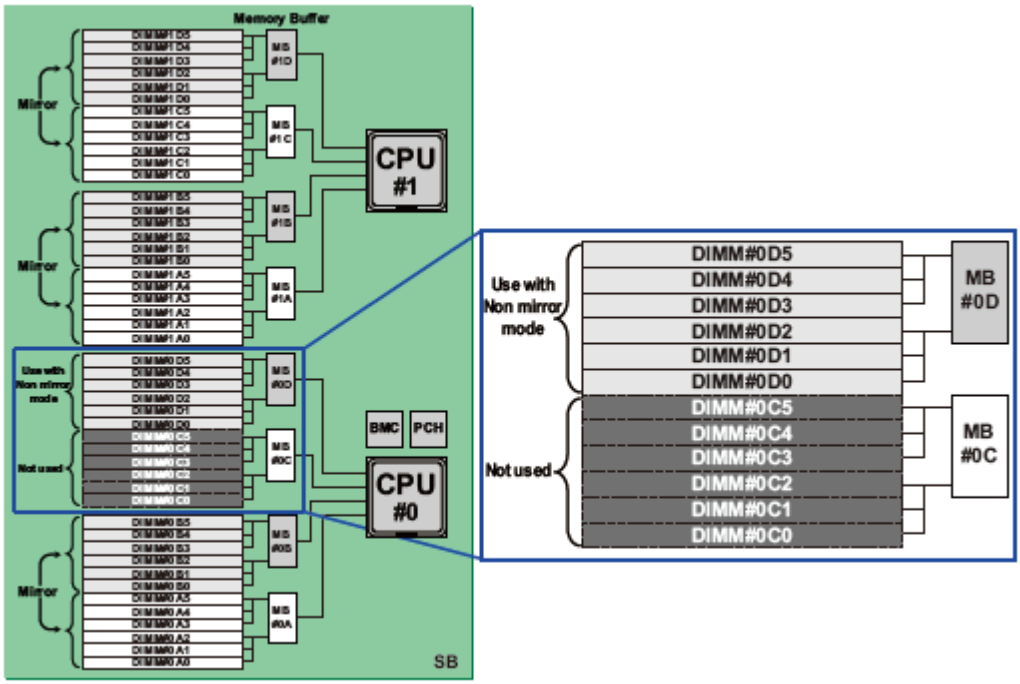


FIGURE 3.17 Status when an error has occurred in the memory (memory capacity maintenance mode)



The patterns supported in the combination of memory mirror status and failed DIMM are listed in the table below.

TABLE 3.9 Combination of the memory mirror status and the failed DIMM (Non Mirror)

Mirror RAS Mode	Mirror mode before reboot (during operation)	Places where the DIMM has failed	Mirror mode after reboot	Memory capacity after reboot
Mirror Keep Mode	Full Mirror	Mirror part	Full Mirror (*1)	Reduction (*1)
	Partial Mirror	Mirror part	Partial Mirror (*1)	Reduction (*1)
		Non Mirror part	Partial Mirror (*1)	Reduction (*1)

Mirror RAS Mode	Mirror mode before reboot (during operation)	Places where the DIMM has failed	Mirror mode after reboot	Memory capacity after reboot
Capacity Keep Mode	Full Mirror	Mirror part	Partial Mirror or Non-Mirror (*1)	No change (*1)
	Partial Mirror	Mirror part	Partial Mirror or Non-Mirror (*1)	No change (*1)
		Non Mirror part	Partial Mirror (*1)	Reduction (*1)

*1: Switches to the Reserved SB when a Reserved SB has been set. Therefore, the system returns to the status before the reboot.

Memory Mirror conditions

The conditions of Memory Mirroring are as follows.
The DIMM is mounted following the ‘G.2.1 DIMM mounting sequence’.
The condition for the hardware is to have the same capacity as that of the mirroring DIMM group.

Memory Mirroring

Memory Mirroring is executed in the memory on the same SB.

3.2.5 Hardware RAID

The PRIMEQUEST 2000 series supports Hardware RAID.
Hardware RAID is a RAID function that performs operations using the SAS array controller card. The SAS array controller card is a PCI Express card having a dedicated RAID controller chip and firmware, and which can control the array (faulty HDD disconnection, incorporation, LED control).
RAID levels supported in the hardware RAID are RAID0, RAID1, RAID5, RAID6, RAID1E, RAID10, RAID50, and RAID60.
However, RAID level supported in the HDD/SSD on the SB and DU are RAID0, RAID1, RAID5, RAID6, RAID1E, and RAID10.
For details on the hardware RAID setting, see ‘Server View RAID Management User Manual’. For details on the HDD/SSD replacement of the hardware RAID configuration, see ‘5.3 Replacing HDD/SSD when active replacement is not possible’.
Note

- -The hardware RAID and the Software RAID (GDS) are mutually exclusive in the same partition.
- -When using the hardware RAID, consider either of the following conditions to protect the customer’s data in the event of a power failure.
- An FBU is mounted.
- Ensure stable AC power by redundant power mechanism, dual system reception mechanism, and UPS.

3.2.6 Server View RAID

For details on the Server View RAID, see ‘Server View RAID Management User Manual’.

3.2.7 Cluster configuration

- For inter-cabinet clustering, clustering with only PRIMEQUEST 2000 series is supported. The inter-cabinet clustering with cabinets other than PRIMEQUEST 2000 series is not supported.
- For inter-cabinet clustering, clustering with only the same models is supported. The inter-cabinet clustering with different models such as clustering with PQ2400E and PQ2800E is not supported.

3.3 Replacing components

Components to be replaced can be identified from the replacement board and OPL LED display. For details on the LED display, see Appendix F Status Checks with LEDs.

3.3.1 Replaceable components

Replaceable components and replacement conditions are listed in the table below.

TABLE 3.10 Replaceable components and replacement conditions

Component name	AC power off (Device stop)	AC power on status All partitions off status (hot maintenance)	AC power on target partition off (hot maintenance)	AC power on target partition on (hot maintenance)
PSU_P/PSU_S	Replaceable	Replaceable	Replaceable (*1)	Replaceable (*1)
FANM	Replaceable	Replaceable	Replaceable (*1)	Replaceable (*1)
FANU	Replaceable	Replaceable	Replaceable	Replaceable
FANM	Replaceable	Replaceable	Replaceable	Replaceable
SB	Replaceable	Replaceable	Replaceable	Replaceable (*5)
CPU	Replaceable	Replaceable	Replaceable	Not replaceable
DIMM	Replaceable	Replaceable	Replaceable	Not replaceable
Mezzanine	Replaceable	Replaceable	Replaceable	Not replaceable
DIMM	Replaceable	Replaceable	Replaceable	Not replaceable
PCI Express card	Replaceable	Replaceable	Replaceable	Not replaceable
FBU	Replaceable	Replaceable	Replaceable	Not replaceable
HDD/SSD	Replaceable	Replaceable	Replaceable	Replaceable (*2)
Battery	Replaceable	Replaceable	Replaceable	Not replaceable
IOU_1GbE/IOU _10GbE	Replaceable	Replaceable	Replaceable	Replaceable (*5)
PCI Express card	Replaceable	Replaceable	Replaceable	Not replaceable
DU	Replaceable	Replaceable	Replaceable	Not replaceable
PCI Express card	Replaceable	Replaceable	Replaceable	Not replaceable
FBU	Replaceable	Replaceable	Replaceable	Not replaceable
HDD/SSD	Replaceable	Replaceable	Replaceable	Replaceable (*2)
MMB	Replaceable	Replaceable (*3)	Replaceable (*3)	Replaceable (*3)
OPL	Replaceable	Not replaceable	Not replaceable	Not replaceable
MP, PDB	Replaceable	Not replaceable	Not replaceable	Not replaceable
PCI_Box	Replaceable	Replaceable	Replaceable	Not replaceable
IO_PSU	Replaceable	Replaceable	Replaceable (*1)	Replaceable (*1)
IO_FAN	Replaceable	Replaceable	Replaceable (*1)	Replaceable (*1)
PEXU	Replaceable	Replaceable	Replaceable	Not replaceable
PCI Express card	Replaceable	Replaceable	Replaceable	Replaceable (*4)

*1: Possible only in configuration.
*2: Possible only for redundancy configuration with RAID.
*3: Possible only for MMB duplication configuration.
*4: PCI hot plug function is required. Operation by maintenance staff is optional.
*5: DR function is required.

3.3.2 Component replacement conditions

This section describes the replacement conditions of each component.

PSU

The PSU unit can be replaced while the system continues operating. PSU replacement in a non-redundant configuration requires the system to be stopped.

FAN

The FAN unit can be replaced while the system continues operating.

SB

If the DR function (SB hot remove and SB hot add) is used, the SB can be replaced even when the partition using the SB is powered on. When the DR function is not used, the SB can be replaced if the partition using the SB is powered off.
Remarks
Since the CPU/Mezzanine/DIMM/PCI Express card /FBU which is mounted on the SB can be replaced after removing the SB from the device, the replacement can be done under the same conditions as the SB.
Note

Since there may be a time deviation after the Home SB is replaced, set the time in the operating system when the NTP is not used.

IOU_1GbE/IOU_10GbE

If the DR function (IOU hot remove and IOU hot add) is used, the IOU_1GbE and IOU_10GbE can be replaced even if the partition that uses the IOU_1GbE/IOU_10GbE is powered on. If the DR function is not used, then the replacement is possible when the partition that uses the IOU_1GbE/IOU_10GbE is powered off.

DU

DU can be replaced when the status of the partition that uses the DU to be replaced is powered off.

MMB

In a system with two MMBs installed, hot replacement can be used to replace an MMB when the system continues operating. Basically, the faulty MMB (Standby MMB) can simply be replaced since a faulty MMB would have been switched with a standby MMB. To replace the active MMB, switch it with the standby MMB before replacing it. The replacement does not affect control and monitoring in the system.

3.3.3 Replacement procedures in hot maintenance

This section describes the procedures before and after replacement in hot maintenance.

Procedure before replacement

See ‘7.1.2 Power off of Partitions’ in “PRIMEQUEST 2000 series Installation Manual” (C122-E174) and stop the relevant partition.

Procedure after replacement

See ‘7.1.1 Power on of partitions’ in “PRIMEQUEST 2000 series Installation Manual” (C122-E174) stop the relevant partition following the

3.3.4 Replacement procedures in cold maintenance

This section describes the procedures before and after replacement in cold maintenance.

Procedure before replacement

Stop all the partitions.

Procedure after replacement

Start the relevant partition.

3.3.5 Replacing the battery backup unit of the uninterrupted power supply unit (UPS)

This section describes the procedure for replacing the battery backup unit of the UPS. The UPS battery is regularly replaced and the life cycle is monitored by the RAS support service.
RAS support service monitors the life cycle and notifies the message as shown below.

TABLE 3.11 Replacement notification messages RAS support service (UPS)

Start time for notifying messages for advance notification of replacement	Replacement message notification time
About 1 year and 9 months from the start of use or replacement of the battery	After about 2 years

For details on the RAS support service, see ‘RAS Support Service User Guide’.

3.3.6 Replacing the PCI SSD card

This section describes the procedure for replacing the PCI SSD card.
Note
The PCI SSD card does not support hot replacement. Stop the partition before replacing.

In a RAID configuration (Linux software RAID)

1. Place the faulty PCI Express card offline and remove the card.
   Example:

```
# mdadm/dev/md0 --fail  /dev/fiob
# mdadm/dev/md0--remove  /dev/fiob
```

2. Power off the partition.
   For details on the powering off the partition, see '7.1.2 Powering off partitions' in "PRIMEQUEST 2000 series Installation Manual" (C122-E174).
3. Replace the faulty PCI Express card.
4. Power on the partition.
   For details on powering on the partition, see '7.1.1 Powering on Partitions' in the "PRIMEQUEST 2000 series Installation Manual" (C122-E174).
5. Initialize the replaced PCI Express card.
6. The executing procedure is as follows.
   a. fio-detach (Disconnecting the device from the operating system)
   b. fio-format (Low level formatting of the device)
   c. fio-attach ((Making the device available on the operating system)

   Example:

```
# fio-detach /dev/fct1
# fio-format /dev/fct1
# fio-attach /dev/fct1
```

   Remarks
   The work of adding the device will trigger the rebuild operation.
   Example:

```
# mdadm /dev/md0 --add /dev/fiob
```

In SWAP configuration

1. Delete the swap entry of the faulty PCI Express card.

```
(Example) # swapoff /dev/fioal
```

2. Confirm the serial number of the faulty PCI card
3. Delete the serial number of the failed PCI card from the pre-allocate memory in /etc/modprobe.d/iomemory-vsl.conf.
   Note
   Before replacing the PCI card, delete the serial number of the faulty PCI card from the pre-allocate memory in /etc/modprobe.d/iomemory-vsl.conf.
   For details on the procedure, see Using the Device as Swap and Appendix C - Using Module Parameters in the PCIe SSD-785GB/PCIe SSD-1.2TB ioMemory VSL x.x.x User Guide for Linux. x.x.x is the version number.
4. Power off the partition.
   For details on powering off, see '7.1.2 Powering off Partitions' in the "PRIMEQUEST 2000 series Installation Manual" (C122-E174).
5. Replace the faulty PCI Express card.
6. Power on the partition.
   For details on powering on the partition, see '7.1.1 Powering on Partitions' in the "PRIMEQUEST 2000 series Installation Manual" (C122-E174).
7. Initialize the replaced PCI Express card.
   The executing procedure is as follows.
   a fio-detach (Disconnecting the device from the operating system)
   b fio-format (Low-level formatting of the device)

Remarks
If the device is used as a SWAP device, the formatting must have a 4K sector size.

c fio-attach (Making the device available on the operating system)
Example:

```
# fio-detach /dev/fct0
# fio-format -b 4K /dev/fct0
# fio-attach /dev/fct0
```

Remarks
For details on each command, see 'Appendix A-Utility Reference' in the 'PCIeSSD-785GB/PCIeSSD-1.2TB ioMemory VSL x.x.x User Guide for Linux'. x.x.x. is the version number.

8. Create a swap entry for the replaced PCI Express card.
Remarks
A partition must be created before creating a swap entry.
Example:

```
# mkswap /dev/fioa1
# swapon /dev/fioa1
```

9. Confirm the serial number of the replaced PCI Express card.
10. Register the serial number of the replaced PCI Express card in the pre-allocate memory in /etc/modprobe.d/iomemory-vsl.conf.
Note
After replacing the PCI Express card, add the target serial number in the pre-allocate memory in /etc/modprobe.d/iomemory-vsl.conf.
11. Restart the partition (opening system).

3.4 Expansion of components

This section describes how to add components.
The components and the conditions for maintaining the addition of each component are listed in the table below.
Some components cannot be added.

TABLE 3.12 Expandable components

Component name			AC power off (Device stop)	AC power on All partitions off (hot maintenance)	AC power on Target partition off (hot maintenance)	AC power on Target partition on (hot maintenance)
PSU_P/PSU_S			Expandable	Not Expandable	Not Expandable	Not Expandable
	FANM		-	-	-	-
FANU			-	-	-	-
	FANM		-	-	-	-
SB			Expandable	Expandable	Expandable	Expandable (*2)
	CPU		Expandable	Expandable	Expandable	Not expandable
	DIMM		Expandable	Expandable	Expandable	Not expandable
	Mezzanine		-	-	-	-
		DIMM	Expandable	Expandable	Expandable	Not expandable
	PCI Express card		Expandable	Expandable	Expandable	Not expandable
		FBU	Expandable	Expandable	Expandable	Not expandable
	HDD/SSD (*3)		Expandable	Expandable	Expandable	Expandable
	battery		-	-	-	-
IOU_1GbE/IOU_10GbE			Expandable	Expandable	Expandable	Expandable (*2)
	PCI Express card		Expandable	Expandable	Expandable	Not expandable
DU			Expandable	Expandable	Expandable	Not expandable
	PCI Express card		Expandable	Expandable	Expandable	Not expandable
	FBU		-	-	-	-
	HDD/SSD		Expandable	Expandable	Expandable	Expandable
MMB (*3)			Expandable	Expandable	Expandable	Expandable
OPL			-	-	-	-

Component name			AC power off (Device stop)	AC power on All partitions off (hot maintenance)	AC power on Target partition off (hot maintenance)	AC power on Target partition on (hot maintenance)
MP, PDB			-	-	-	-
PCI_Box (*3)			Expandable	Expandable	Expandable	Not expandable
	IO_PSU		Expandable	Expandable	Expandable	Expandable
	IO_FAN		-	-	-	-
	PEXU		-	-	-	-
		PCI Express card	Expandable	Expandable	Expandable	Expandable (*1)

- : Outside the expansion target
*1: PCI hot plug function is required
*2: DR function is required
*3: For only PRIMEQUEST 2400E and 2800E.

Perform the license authentication following the Windows window instructions.

Windows license authentication
When starting Windows, click the balloon for license authentication that is displayed in the task tray.
Click [Product Key Input] and enter the product key found on the COA label belonging to the enable kit.
License authentication can be performed via the Internet or by making a phone call to the Microsoft customer service center.

Hot add procedure for HDD/SSD

For details on the hot add procedure for HDD/SSD, see CHAPTER 5 Replacement of HDD/SSD.

Changing the firmware when expanding components

The firmware may be required to be changed when expanding a component.
Use the same firmware version number of the FC (Fiber Channel) card within the same partition.

- FC card (PCI Express card)
  Use the same version number as the firmware version number that is currently in use.

How to confirm the firmware number

After adding a card, and the partition is started, use the following procedure to confirm the firmware version number.
How to confirm the FC card firmware version number
To confirm the version number, see ‘1.2.14 [IOU] menu’ or‘1.2.18 [PCI_Box] menu’ in the “PRIMEQUEST 2000 series Tool Reference’ (C122-E177).

Changing the firmware

If the firmware version numbers are not identical, change the firmware.
The information on the firmware and the procedure are provided in the following website.
Download of drivers and the bundled software of the PRIMEQUEST 2000 series.
Remarks
In the PRIMEQUEST 2000 series, the customer will change a part of the firmware.

3.4.1 Procedure of expansion in hot maintenance

This section describes the procedures before and after expansion in hot maintenance.

Procedure before expansion

“Stop the relevant partition referring to ‘7.1.2 Powering off Partitions’ in the “PRIMEQUEST 2000 series Installation Manual” (C122-E174).

Procedure after expansion

Start the relevant partition referring to‘7.1.1 Powering on Partitions’ in the “PRIMEQUEST 2000 series Installation Manual” (C122-E174).

3.4.2 Procedure of expansion in cold maintenance

This section describes the procedures before and after expansion in cold maintenance.

Procedure before expansion

Stop all the partitions referring to‘7.1.2 Powering off Partitions’ in the “PRIMEQUEST 2000 series Installation Manual” (C122-E174).

Procedure after expansion

Start the required partition referring to 7.1.1 Powering on Partitions’ in the “PRIMEQUEST 2000 series Installation Manual” C122-E174).

3.4.3 Expansion of PCI SSD card

This section describes the procedure of expanding the PCI SSD card (PCI Express SSD card 785GB / PCI SSD card1.2TB).

Note

Hot replacement is not supported in the PCI SSD card. Stop the partition before the addition.

In a RAID configuration (Linux software RAID)

1. Power off the partition.

   For details on powering off, see ‘7.1.2 Powering off Partitions’ in the “PRIMEQUEST 2000 series Installation Manual” (C122-E174).

2. Add the PCI Express card.

3. Power on the partition**.**

   For details on powering on the partition, see ‘7.1.1 Powering on Partitions’ in the “PRIMEQUEST 2000 series Installation Manual” (C122-E174).

4. Set the environment of the added PCI Express card.

Remarks

For details on the environmental setting procedure, see ‘PCIe SSD-785GB/PCIe SSD-1.2TB ioMemory VSL x.x.x User Guide for Linux’. x.x.x is the version number.

In a SWAP configuration

1. Power off the partition.

   For details on powering off, see ‘7.1.2 Powering off Partitions’ in the “PRIMEQUEST 2000 series Installation Manual” (C122-E174).

2. Add the PCI Express card.

3. Power on the partition.

   For details on powering on the partition, see ‘7.1.1 Powering on Partitions’ in the “PRIMEQUEST 2000 series Installation Manual” (C122-E174).

4. Set the environment of the added PCI Express card.

Remarks

For details on the procedure of setting the environment, see ‘PCIe SSD-785GB/PCIe SSD-1.2TB ioMemory VSL x.x.x User Guide for Linux’. x.x.x is the version number.

5. Restart the partition (operating system).

3.5 Process after switching to the Reserved SB and Automatic Partition Reboot

This section describes the processes after switching to the Reserved SB, and the partition has automatically rebooted (example, status check and re-configuration).

3.5.1 Checking the status after switching to a Reserved SB and automatic rebooting

The status after the partition reboot is checked in the [Partition Configuration] window, [System Status] window, [SB #x] window of the MMB Web-UI.
Immediately after switching to a Reserved SB and the partition has started (booted), the status will be as follows.

- The Reserved SB is incorporated in the partition in place of the faulty SB.
- The setting of Reserved SB for multiple partitions cancelled if the Reserved SB that was incorporated in the partition in place of the faulty SB had been the Reserved SB for multiple partitions before the incorporation.
- The faulty SB is disconnected from the partition configuration and freed.

3.5.2 Processing after replacement of a faulty SB

This section describes how to reconfigure a Reserved SB after replacement of a faulty SB. Perform the settings as needed, considering the current configuration and the operating status.
After switching to the Reserved SB and partition reboot, the following Procedures of 1 and 2 are required. The process for partition configuration is required, except when continuing the operation without setting a new Reserved SB.

1. Restore the Reserved SB that was incorporated in the partition to replace the faulty SB, to a Reserved SB again.
2. Set the replacement SB as a Reserved SB.

This section describes the operation of procedure 1 noted above.

1. From the log, analyze all the partitions where the Reserved SB (hereafter referred to as the source Reserved SB) was incorporated in the partition in place of the faulty SB.
   For details on the analysis procedure, see 3.5.3 Checking the source partition configuration information when switching to a Reserved SB.
2. Check the status.
   Click [System] - [System Status]. Check the status in the [System Status] window.
3. Stop the partition.
   a Click [Partition] - [Power Control]. The [Power Control] window appears.
   b Select [Power Off] from the [Power Control] of the relevant partition and click the [Apply] button.
4. Check the configuration status of the partition.
   Click [Partition] - [Partition Configuration]; check the configuration status of the partition in the [Partition Configuration] window.
5. Incorporate the replacement SB.
   a Click [Partition] - [Partition Configuration] - [Add Unit] button. [Add SB/IOU to Partition] window appears.
   b Click the radio button of the replacement SB; then click the [Apply] button. The replacement SB will be incorporated into the partition.
6. Restore the source Reserved SB to a Reserved SB again.
   a Click [Partition] - [Partition Configuration] - [Remove Unit] button. [Remove the SB/IOU from the Partition] window appears.
   b Click the radio button of the source Reserved SB; then click the [Apply] button. The source Reserved SB will be disconnected from the partition and will be in the free status.
   c Click [Partition] - [Reserved SB Configuration]. [Reserved SB Configuration] window, check the check box of the SB set to the free status in 2) mentioned above, select the reserved target partition and click the [Apply] button. When reserving multiple partitions, select them at the same time and click the [Apply] button.

7. Start the partition.
   Click [Partition] - [Power Control]. In the [Power Control] window, select [Power on] from [Power Control] of the relevant partition, and click the [Apply] button. The partition will start.

When setting the maintenance replaced SB as a Reserved SB

Perform the following procedures for the replaced SB.

1. From the log, analyze all the partitions where a Reserved SB that was incorporated in a rebooted partition place of a faulty SB.
   For details on the analysis procedure, see '3.5.3 Checking the source partition setting information when switching to a Reserved SB'.
2. Check the status.
   Click [System] - [System Status]. Confirm the status in [System Status] window.
3. Confirm the configuration status of the partition.
   Click [Partition] - [Partition Configuration].
   Check the configuration status of the partition in the [Partition Configuration] window.
4. Set the replaced SB as the Reserved SB.
   a Click [Partition]-[Reserved SB Configuration]. [Reserved SB Configuration] window appears.
   b Check the check box of the SB replaced for maintenance.

   Select reserve target and click the [Apply] button.
   If there are multiple reserve targets, select them simultaneously and click the [Apply] button.

3.5.3 Checking the source partition configuration information when switching to a Reserved SB

This section describes the method of checking the source partition configuration information when there is a switch to a Reserved SB.

Note

Checking the source partition configuration information is presumed basically from the SEL information output by the MMB, but it need not necessarily be uniquely determined. It should be determined from the operation status of the partition during Reserved SB switching.

A case where the partition and a Reserved SB have been set is given below. SB #c of Partition #R, is set as the Reserved SB of Partition #P and Partition #Q.

TABLE 3.13 Partition setting (before switching)

Partition	SB		
	a	b	c
Partition #P	O		
Partition #Q		O	
Partition #R			O

O: Indicates the partition setting status

TABLE 3.14 Reserved SB setting (before switching)

Partition	SB		
	a	b	c
Partition #P			O
Partition #Q			O
Partition #R			

O ：Indicates the status of the Reserved SB

When there is a fault in SB #a, and SB #a is switched to Reserved SB #c, the SB that configures the partition changes as follows.

```
Partition #P: SB #a -> Partition #P: SB#c
Partition #Q: SB #b -> Partition #Q: SB#b
Partition #R: SB #c -> Partition #R:  ----
```

The status transition of each partition is shown from (1) to (4) of the 'Partition status transition' in the table below.

TABLE 3.15 Partition status transition

Partition	Status transition (Chronological: Left to right)			
	(1)	(2)	(3)	(4)
Partition #P	In operation	Faulty	Reset/SB switching	Power on -> In operation
Partition #Q	In operation	In operation	In operation	In operation
Partition #R	In operation	In operation	Power off	Power off

Even if Partition #P, Partition #Q or Partition #R is running, the status of the partition will be as indicated in (1) in the table.

TABLE 3.16 Description of partition status transition

No.	Description (the numbers correspond to the status transition)
(1)	Partition #P, Partition #Q and Partition #R are in operation.
(2)	SB #a of Partition #P becomes faulty.
(3)	SB #a of Partition #P is disconnected and stopped. Following this, Partition #R is powered off. After that, SB #c is removed from Partition #R configuration, and the specification of Reserved SB of Partition #Q is canceled.
(4)	After being removed from the Partition #Q configuration, SB #c is configured as the SB of Partition #P. Partition #P is automatically powered on and the partition begins to operate.

In the status transition of (1) to (4), SB #c is incorporated in Partition #P in place of the faulty SB #a, restarted and it starts operating. Partition #Q is not affected. Partition #R stops and SB #c is removed from the configuration. SB #c, which was set as a Reserved SB in (1), is cleared of this status.
The resulting status shown in 'Partition setting (after switching)'and 'Reserved SB setting (after switching)'. After the SB switches to the Reserved SB, MMB changes its settings as shown in the table below.

TABLE 3.17 Partition setting (after switching)

Partition	SB		
	a	b	c
Partition #P			O
Partition #Q		O	
Partition #R			

O: Shows the partition setting status

TABLE 3.18 Reserved SB setting (after switching)

Partition	SB		
	a	b	c
Partition #P			
Partition #Q			
Partition #R			

O: Indicates the setting status of the Reserved SB (However, all are blank)
When there was a switch to the Reserved SB as mentioned above, MMB displays the following SELs.

```
SEL-1. SB #a was replaced with Reserved SB #c in Partition #P
SEL-2. Reserved SB #c was removed from Partition #Q
SEL-3. Reserved SB #c was removed from Partition #R
```

SEL-1 indicates that SB #a of Partition #P has been switched to Reserved SB #c.
The messages of SEL-2 and SEL-3 indicate that the Reserved SB setting for SB #c has been canceled, or SB #c has been removed from the operating partition, when there was a switch to the Reserved SB #c.
The status is determined from the partition operation before add after the switching. In the above example, since Partition #R was powered off just before SB #c was removed, you can see that SB #c has been removed from Partition #R that is in operation.

3.6 Replacing the Home SB No.

The Socket No. of the Home SB is made as 0 and operated. This section describes the replacement of the Home SB No., which logically replaces the physical SB0, when an SB, not being a physical SB0 becomes the Home SB. A number will be allocated for an SB not configured with LSB of P0/P1. An example can be seen below.

TABLE 3.19 Example of Home SB No. replacement

Physical SB	Physical SB0	Physical SB1	Physical SB2	Physical SB3
Partition	partition (P0)	partition1 (P1)		

configuration				
home SB	Home SB of P0	Home SB of P1	-	-
Logical SB of P0 (LSB)	LSB0	LSB1	LSB2	LSB3
Logical SB of P1 (LSB)	LSB1	LSB0	LSB2	LSB3

As default (one partition four SB configuration), the relationship between the LSB No. and Socket No. is as follows.

TABLE 3.20 Relationship between LSB No. and Socket No

LSB No.	Socket No.
0	0, 1
1	2, 3
2	4, 5
3	6, 7

CHAPTER 4 PCI Card Hot Maintenance in Red Hat Enterprise Linux 6

This chapter describes hot maintenance of PCI cards in Red Hat Enterprise Linux 6.

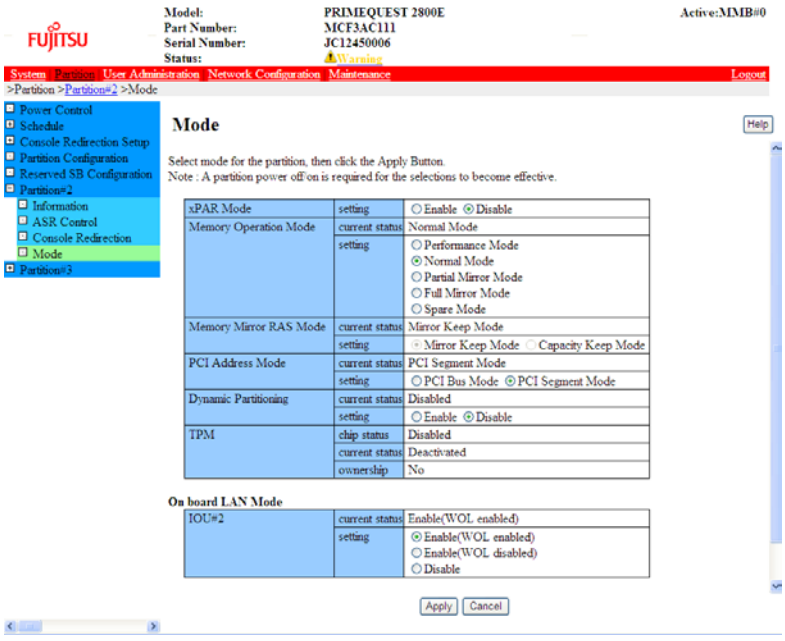
4.1 Dynamic Reconfiguration (DR)

This section describes Dynamic Reconfiguration (DR).
DR function has to be enabled by MMB Web-UI and Dynamic Reconfiguration Utility package has to be installed in the system to perform hot maintenance of SB and IOU. For hot maintenance of PCI Express card, neither Enabling DR function nor installing Dynamic Reconfiguration Utility package has to be always needed.
For the summary of the DR function, applicable rules and corresponding list and restrictions, see '3.2.1 Dynamic Reconfiguration (DR)'.
For details on the MMB Web-UI/CLI, see respective chapters in "*PRIMEQUEST 2000 series Tool Reference*" (C122-E177).
For details on the OS CLI, see '5.1 DR command' in "*PRIMEQUEST 2000 series Tool Reference*" (C122-E177).

4.1.1 DR function configuration setting

Enable/Disable is set for the DR function of each partition, from Partition->Partition #x->Mode window of MMB Web-UI. If the settings are changed while the target partition is running, the settings will be reflected at the next partition restart. Items for [Dynamic Reconfiguration] of the [Mode] window can be seen below.

FIGURE 4.1 [Mode] window (Dynamic Reconfiguration)



Item		Description
Dynamic Reconfiguration	current status	Setting status of the current DR function (Enable/Disable)
	setting	Dynamic Reconfiguration function Enable/Disable setting -Enable -Disable (Default)

4.1.2 dp Command Package Install/ Uninstall

This section describes the install /uninstall of the dp command package.
The dp command can be applied using the SVIM application wizard. When installing after building the system, procure the package from Fujitsu Web download site, and install following the procedure below.
<Common install /uninstall>
Use FJSVdp-util-RHEL<Version number>-x.x.x-x-x86_64.tar.gz.
The file name for the RHEL6 dp command package is FJSVdp-util-RHEL6-x.x.x-x-x86_64.tar.gz. the following files are stored.

FJSVdp-util/RPMS/FJSVdp-util-RHEL6-x.x.x-x.noarch.rpm
FJSVdp-util/SRPMS/FJSVdp-util-RHEL6-x.x.x-x.noarch.rpm
FJSVdp-util/DOC/README.ja_JP.EUC.txt
FJSVdp-util/DOC/README.ja_JP.SJIS.txt
FJSVdp-util/DOC/README.ja_JP.UTF-8.txt
FJSVdp-util/DOC/README.txt
FJSVdp-util/INSTALL.sh
FJSVdp-util/UNINSTALL.sh

<When installing>
Install FJSVdp-util-RHEL6-x.x.x-x.noarch.rpm using the following procedure.

1. Become super user.

```
$ su -
```

2. Execute INSTALL.sh in the FJSVdp-util directory.
   Depending on the status, the rpm package will be installed or uninstalled.

```
# FJSVdp-util/INSTALL.sh
```

3. Restart the system.

```
# /sbin/shutdown -r     now
```

<During uninstallation>
Perform the uninstallation using the following procedure.

1. Becomes super user.

```
$ su -
```

2. Execute UNSTALL.s in the FJSVdp-util directory.

```
# FJSVdp-util/UNINSTALL.sh
```

3. Restart the system.

```
# /sbin/shutdown -r now
```

4.2 Hot add of SB

This section describes the hot add of SB.

4.2.1 Preparing for SB hot add

The preparation flow is described below.

1. Estimate the following capacities.
   - Resources to be added (CPU/DIMM)
   - Number of CPUs and DIMMs to be added
2. Arrange the SBs to be added.
3. Check if the volume of resources estimated in arranged SBs to be added, have been mounted.
4. Confirm the installation of the DR function using the following procedure.

a. Check if the size of the dump disk save area is sufficient for the memory capacity to be added. For details on how to estimate the size required, contact the distributor where you purchased your product, or your sales representative.
b. Check if the points/restrictions are clear. For detail, see '3.2.1 Dynamic Reconfiguration (DR)'

5. Switch to the maintenance mode.
   Insert the SB to be added into a free SB slot.
6. Check for any errors in the SB to be added.
   Example : How to check from the MMB Web-UI
   a. Open System >SB >SB #n window.
   b. Check if the status of the [Board Information] is 'OK'.
   c. Check if the other statuses displayed in SB #n window are 'OK'.
   d. Open Partition >Partition Configuration window.
   e. Check if the status of the SB for addition is a Free SB or Reserved SB. The number of the SB for adding is noted down.

Update the firmware of the SB for addition.

4.2.2 Confirming the status of SB before SB hot add

1. Estimating how long times OS will take to process SB hot add.
   Estimate how long times OS will take to process SB hot add and confirm that the estimated time does not exceed one hundred minutes.
   If the estimated time exceeds one hundred minutes, reduce the load of the system.
   If SB hot add is performed in the system with high load, timeout may occur while OS processes SB hot add because big performance of CPU is needed to initialize added memories.
   For how to deal with when timeout occurs, see '4.2.3 DR operation in SB hot add'.

   The time *t* when OS will take to process SB hot add can be estimated by below equation, where the unit is second:

$$t = t_1 + t_2 + t_3 + t_4$$

   where,

   t_1 : the time when OS will take to recognize added resources
   t_2 : the time when the pre-process of collaboration program is working
   t_3 : the time when OS will take to activate added resources
   t_4 : the time when the post-process of collaboration program is working

   The time t_1 when OS will take to recognize added resources can be estimated by below equation:

$$t_1 = 0.8 \times M_1$$

   where,

   M_1 : size of added memories (GB unit)

   The time t_3 when OS will take to activate added resources can be estimated by below equation.

$$t_3 = 0.002 \times M_1 \times M_2 \times ceil\left(\frac{P_1 + 1}{C_1}\right)$$

   where,

   M_1 : size of added memories (GB unit)
   M_2 : total size of memory after SB hot add (GB unit)
   P_1 : the number of running process
   C_1 : the number of CPU before SB hot add

Above *ceil* (*x*) expresses the ceiling function. The *ceil* (*x*) is the smallest integer not less than real number *x.* e.g. *ceil* (2.15) = 3, *ceil* (4) = 4.
For how to get P_1 and C_1, see below 'Reference'.
The estimation of the time t_2 and t_4 when collaboration program is working is equal to the sum of the time when each program registered as collaboration program in /opt/FJSVdp-util/user_command will take to finish process. For how to estimate how long time each collaboration program takes to finish process, see below 'Reference'.

Reference
Getting the number of running process P_1
The number of running process P_1can be got by below command.

```
# grep procs_running /proc/stat
procs_running 1
```

Getting the number of CPU before SB hot add C_1

```
# grep -c processor /proc/cpuinfo
120
```

Estimating the time when each collaboration program will take to finish process
Check the developer of the collaboration program in /opt/FJSVdp-util/user_command by below rpm command. Ask the developer about the time for the process of the collaboration program.

```
$ rpm -qif /opt/FJSVdp-util/user_command/10-FJSVdp-util-
kdump-restart
...
```

Below scripts will finish both their pre-process and post-process for around one minute.

```
10-FJSVdp-util-kdump-restart
89-FJSVdp-util-irqbalance-restart
90-FJSVdp-util-detect-passthrough-dev
```

2. Confirming the size of resources before SB hot add
Confirm the status of the SB before SB hot add to compare the state after SB hot add with the state before SB hot add. The number or sizes of resources before SB hot add can be confirmed by checking below files.

- CPU: /proc/cpuinfo
/proc/cpuinfo outputs information of each CPU recognized by OS at the time when this file is opened. The number of CPU can be obtained by below command.

```
# grep -c processor /proc/cpuinfo
120
```

- Memory: /proc/meminfo
/proc/meminfo outputs size of memory recognized by OS at the time when this file is opened.

```
# cat /proc/meminfo
MemTotal:      65169992 kB
MemFree:       63382120 kB
Buffers:          30034 kB
          :
          :
```

The size of memory can be seen by the line of MemTotal.

4.2.3 DR operation in SB hot add

This section describes the operation of the DR, for performing SB hot add.

1. Log into the MMB Web-UI using Administrator privileges.
2. Execute hotadd command.
Example：When adding SB2 in partition 1.

```
# hotadd  partition 1   SB   2   quiet
#
```

4.2.4 How to deal with when timeout occurs while OS is processing SB hot add

If OS does not finish the process of SB hot add within predetermined time, timeout message “DR sequence timeout: SB hot-add OS failure” is shown on MMB CLI.
It means that DR completion message from OS does not arrive at MMB. In such case, some collaboration programs may hang though DR process is still running on OS. Rebooting the partition is recommended because it is difficult to estimate when the process will be completed.
The process of SB hot add by OS can be mainly divided into three parts. Check /var/log/message, analyzing which process takes a lot of time.

- Pre-process of collaboration program
- Activating added resources
- Post-process of collaboration program

1. Checking pre-process of collaboration program
   Process of below messages in /var/log/messages is pre-process of the collaboration program.

```
Dec 17 00:15:33 xxx dp-util[4457]: INFO : 800 : Detected SB
hot-add
Dec 17 00:15:33 xxx dp-util[4457]: INFO : 801 : Added SB3,
Node6,7
Dec 17 00:15:33 xxx dp-util[4457]: INFO : 807 : Execute 1
user programs at ADD_PRE timing
...
Dec 17 00:15:34 xxx dp-util[4457]: 10-FJSVdp-util-kdump-
restart : INFO : start
...
Dec 17 00:15:34 xxx dp-util[4457]: 10-FJSVdp-util-kdump-
restart : INFO : result: 0
...
Dec 17 00:15:34 xxx dp-util[4457]: INFO : 808 : Executed
user programs at ADD_PRE timing
```

   If “INFO : 808 : Executed user programs at ADD_PRE timing” is not output, pre-process of the collaboration program is delayed. Check which collaboration program takes a lot of time by seeing /var/log/messages and ‘collaboration program name.log’ made in /opt/FJSVdp-util/var/log directory, if any. The developer of the collaboration program can be confirmed by below rpm command. Ask the developer about the cause of its delay.

   (Example) Checking the developer of the collaboration program “10-FJSVdp-util-kdump-restart”

```
$ rpm -qif /opt/FJSVdp-util/user_command/10-FJSVdp-util-
kdump-restart
...
```

   Rebooting the partition is recommended because SB hot add process has been imperfect state.

2. Checking the time for activating added resources
   Process of below messages in /var/log/messages is the process of activating added resources.

```
Dec 17 00:15:34 xxx dp-util[4457]: INFO : 802 : Add CPU30-59
(total 30)
Dec 17 00:15:34 xxx dp-util[4457]: INFO : 804 : Add
MEM98304-98559,114688-114943 (total 67108864 kiB)
...
Dec 17 00:15:47 xxx dp-util[4457]: INFO : 809 : Added SB3
```

   If “INFO : 809 : Added SBX” is not output, process of activating added resources is delayed. Check that the process of adding CPU or memory is performed by executing below command at several seconds.

   - Checking the number of CPU

```
$ grep -c processor /proc/cpuinfo
30
```

   - Checking the size of memory

```
$ cat /proc/meminfo |grep MemTotal
```

```
MemTotal:       65271964 kB
```

In case that the number of CPU or the size of memory keeps increasing:

It is expected that cause of the delay is the load of the partition. The process of SB hot add can be completed sooner by reducing the load of the partition.

In case that the number of CPU or the size of memory does not increase though they does not reach expected quantity.

3. Checking post-process of collaboration program
   Process of below messages in /var/log/messages is post-process of the collaboration program.

```
Dec 17 00:15:47 xxx dp-util[4457]: INFO : 807 : Execute 1
user programs at ADD_POST timing
...
Dec 17 00:15:48 SB-hotplug dp-util[4457]: 10-FJSVdp-util-
kdump-restart : INFO : start
...
Dec 17 00:15:49 SB-hotplug dp-util[4457]: 10-FJSVdp-util-
kdump-restart : INFO : result: 0
...
Dec 17 00:15:49 xxx dp-util[4457]: INFO : 808 : Executed
user programs at ADD_POST timing
```

If “INFO : 808 : Executed user programs at ADD_POST timing” is not output, post-process of the collaboration program is delayed. Check which collaboration program takes a lot of time by seeing /var/log/messages and ‘collaboration program name.log’ made in /opt/FJSVdp-util/var/log directory, if any. The developer of the collaboration program can be confirmed by below rpm command. Ask the developer about the cause of its delay.

(Example) Checking the developer of the collaboration program “10-FJSVdp-util-kdump-restart”

```
$ rpm -qif /opt/FJSVdp-util/user_command/10-FJSVdp-util-
kdump-restart
...
```

Rebooting the partition is recommended because SB hot add process has been imperfect state.

4.2.5 Operation after SB hot add

This section describes the process and operations after SB hot add.
After completing DR command operation, check that the quantity of added resources is correct by opening below files as doing before SB hot add.

- CPU: /proc/cpuinfo
  (Added CPU information is added.)

```
# grep -c processor /proc/cpuinfo
180
```

- Memory: /proc/meminfo
  (Added memory size is reflected to MemTotal)

```
# cat /proc/meminfo
MemTotal:        98724424 kB
MemFree:         96825552 kB
Buffers:            30804 kB
 :
 :
```

If below command keeps to be executed, added resources are not reflected. Re-execute the command in order to reflect added resources.

- sar
- iostat
- mpstat

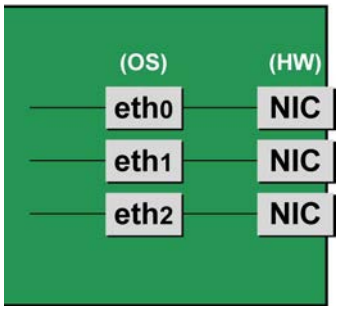
4.3 Hot replacement of IOU

This section describes the hot replacement of the IOU. There are two cases in hot replacement of the IOU:

- Replacing IOU itself due to trouble of IOU itself or trouble of onboard NIC
- Replacing, expanding or removing PCI Express card installed in IOU

For replacing, expanding or removing PCI Express card, IOU itself does not need to be replaced. However, it is needed that the IOU has to be removed from the cabinet for a moment. Then there is the same impact as that of replacing IOU. It is needed to take the same steps as those of replacing IOU.
Note

- If IOU itself is hot replaced, onboard NIC of the IOU is replaced.
  Note that MAC address of onboard NIC is changed after replacing IOU.
- PCI address (bus address) of PCI Express card on IOU may change after hot replacement of IOU. This change may be occurred for replacing, expanding or removing PCI Express card.
- If iSCSI (NIC) is mounted on an IOU, hot replacement of the IOU can be performed only if all of below conditions are satisfied.
  - DM-MP (Device-Mapper Multipath) or ETERNUS multi driver (EMPD) is used for storage connection.
  - Multiple path is made with a NIC on the IOU to be replaced and a NIC on an IOU other than the IOU to be replaced.
  - A NIC on the IOU to be replaced makes an interface independently.
    Example of single interface:



  - If FC card used for SAN boot is mounted on an IOU to be replaced, hot replacement of the IOU cannot be performed.

The step of hot replacement of IOU is described below in order.

4.3.1 Preparation for IOU hot replacement

The description of the flow of preparations is given below.

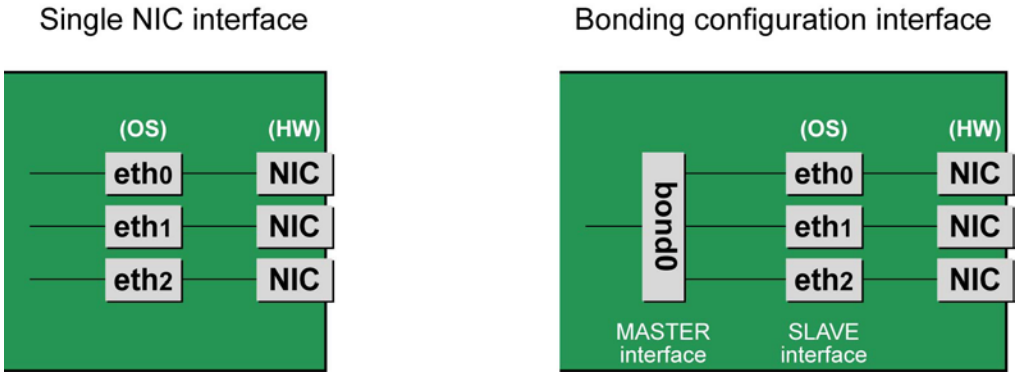
1. Arrange for the IOU for replacement.
   Note
   This step is not needed if the IOU is reused when expanding, replacing or removing PCI Express card. After arranging for the IOU, check whether I/O device of the IOU normally works at free partition. Pre-diagnosis does not performed when IOU is added.
2. For replacing IOU or expanding, replacing or removing PCI Express card in the IOU, it is needed to remove IOU. If IOU is removed, PCI Express card and onboard NIC installed in the IOU are also removed. Check that no software use the PCI Express card to be removed, performing either of below measure.
   a Stopping the software which uses PCI Express card or onboard NIC in the IOU to be removed before removing.
   b Preventing the software from operating PCI Express card and onboard NIC.

   Execute the command /opt/FJSVdp-util/sbin/dp show IOU from shell on OS to check resources installed in the IOU.
   Example: checking IOU3

```
# /opt/FJSVdp-util/sbin/dp show IOU3
```

```
0000:82:00.0 PCI bridge: PLX Technology, Inc. Device 8748
(rev ca)
0000:83:09.0 PCI bridge: PLX Technology, Inc. Device 8748
(rev ca)
0000:84:00.0 PCI bridge: PLX Technology, Inc. Device 8748
(rev ca)
0000:85:02.0 PCI bridge: PLX Technology, Inc. Device 8748
(rev ca)
0000:85:08.0 PCI bridge: PLX Technology, Inc. Device 8748
(rev ca)
0000:85:09.0 PCI bridge: PLX Technology, Inc. Device 8748
(rev ca)
0000:85:10.0 PCI bridge: PLX Technology, Inc. Device 8748
(rev ca)
0000:85:11.0 PCI bridge: PLX Technology, Inc. Device 8748
(rev ca)
0000:89:00.0 Ethernet controller: Intel Corporation I350
Gigabit
Network Connection (rev 01)
0000:89:00.1 Ethernet controller: Intel Corporation I350
Gigabit
Network Connection (rev 01)
0000:8c:00.0 Ethernet controller: Intel Corporation I350
Gigabit
Network Connection (rev 01)
0000:8c:00.1 Ethernet controller: Intel Corporation I350
Gigabit
Network Connection (rev 01)
0000:8f:00.0 Fibre Channel: Emulex Corporation Saturn-X:
LightPulse
Fibre Channel Host Adapter (rev 03)
0000:8f:00.1 Fibre Channel: Emulex Corporation Saturn-X:
LightPulse
Fibre Channel Host Adapter (rev 03)
```

NIC on the IOU (including onboard NIC)
For replacing IOU itself (replacement of onboard NIC) or expanding, replacing or removing NIC on the IOU, not only common procedure of IOU replacement but also special procedure before and after powering on or powering off IOU is needed. Here describes case of replacement of IOU itself. (otherwise add note) The procedure describes operations where a single NIC is configured as one interface. It also describes cases where multiple NICs are bonded together to configure one interface (bonding configuration). For bonding multiple NIC by using PRIMECLUSTER Global Link Services (GLS), see 'PRIMECLUSTER Global Link Service Configuration and Administration Guide Redundant Line Control Function' (J2UZ-7781).



Notes

- To perform hot replacement in a system where a bonding device is installed, design the system so that it specifies ONBOOT=YES in all interface configuration files (the /etc/sysconfig/network-scripts/ifcfg-eth*files and the /etc/sysconfig/network-scripts/ifcfg-bond*files), regardless of whether the NIC to be replaced is a configuration interface of the bonding device.
  An IP address does not need to be assigned to unused interfaces. This procedure is for preventing the device name of the replacement target NIC from being changed after hot replacement. If ONBOOT=NO also exists, the procedure described here may not work properly.

1. Confirm where the NIC is mounted.
   Confirm the correspondence between PCI Address and interface name of NIC mounted in the IOU which is confirmed by above “dp show IOU” command.
   Example: When PCI Address is “0000:89:00.0”.

```
# ls -l /sys/class/net/*/device | grep "0000:89:00.0"
lrwxrwxrwx. 1 root root 0 Aug 27 16:06 2013
/sys/class/net/eth0/
device ¥
-> ../../../ 0000:89:00.0
```

   The ¥ at the end of a line indicates that there is no line feed.

   In this case, eth0 is the interface name which is correspondent to PCI bus address “0000:89:00.0”.

   Note
   You will use the bus address obtained here in steps 2 and procedure after IOU replacement. Record the bus address so that you can reference it later.

   Next, check the PCI slot number for this PCI bus address.
   Execute “ethtool -p” command, making the LED of NIC blinked. Check IOU or PCI_box connected to the IOU, checking in which slots the NIC is mounted, (e.g. PCI#0)

   Example: Blinking the LED of the NIC corresponding to interface “eth0” for ten seconds.

```
# /sbin/ethtool p eth0 10
```

2. Make a table with information including interface name, hardware address and PCI bus address of NIC mounted on IOU to be replaced.
   Make a below table with information of IOU to be replaced within information which is got by step 1.

TABLE 4.1 Correspondence between bus addresses and interface names

Interface name	Hardware address	Bus address	Location
eth0		0000:89:01.0	Onboard 0
eth1		0000:89:01.1	Onboard 1
eth2		0000:8c:00.0	PCI#0
...		...	...

   Note
   When recording a bus address, include the function number (number after the period).

   - Confirm the correspondence between the interface name and hardware address
     Execute below command, checking the correspondence between the interface name and the hardware address.
     Example: eth0 for a single interface

```
# cat /sys/class/net/eth0/address
2c:d4:44:f1:44:f0
```

     Example: eth0 for a bonding interface

```
# cat /proc/net/bonding/bondY
Ethernet Channel Bonding Driver .........
.
.
Slave interface: eth0
.
Permanent HW addr: 2c:d4:44:f1:44:f0
.
.
```

     You can use this procedure only when the bonding device is active. If the bonding device is not active or the slave has not been incorporated, use the same procedure as for a single interface.

     Also, the correspondence between the interface name and hardware address is automatically registered by the system in the udev function rule file, /etc/udev/rules.d/70-persistent-net.rules. Confirm that the ATTR{address} and NAME items have the same definitions as in the above output.

Example: eth0

```
grep eth0 /etc/udev/rules.d/70-persistent-net.rules

SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ¥
ATTR{address}=="2c:d4:44:f1:44:f0", ATTR{type}=="1", ¥
KERNEL=="eth*", NAME="eth0"
```

The ¥ at the end of a line indicates that there is no line feed.

You can always obtain the correct hardware address from the description in etc/udev/rules.d/70-persistent-net.rules regardless of whether the interface is incorporated in bonding.

Confirm the hardware address of other interfaces by repeating the operation with the same command. The following table lists examples of descriptions.

TABLE 4.2 Hardware address description examples

Interface name	Hardware address	Bus address	Location
eth0	2c:d4:44:f1:44:f0	0000:89:01.0	Onboard 0
eth1	2c:d4:44:f1:44:f1	0000:89:01.1	Onboard 1
eth2	00:19:99:d7:36:5f	0000:8c:00.0	PCI#0
...		...	...

3. Execute the higher-level application processing required before NIC replacement.
   Stop all access to the interface as follows. Stop the application that was confirmed in step 2 as using the interface, or exclude the interface from the target of use by the application.

4. Deactivate the NIC.
   Execute the following command to deactivate all the interfaces that you confirmed in step 2. The applicable command depends on whether the target interface is a single NIC interface or the SLAVE interface of a bonding device.

   For a single NIC interface:

   ```
   # /sbin/ifdown ethX
   ```

   If the single NIC interface has a VLAN device, you also need to remove the VLAN interface. Perform the following operations (before deactivating the real interface).

   ```
   # /sbin/ifdown ethX.Y
   # /sbin/vconfig rem ethX.Y
   ```

   For the SLAVE interface of a bonding device:

   If the bonding device is operating in mode 1, use the following steps to exclude safely SLAVE interface to be replaced from operation. In any other mode, removing it immediately should not cause any problems. Confirm that the SLAVE interface to be replaced is the interface currently being used for communication. First, confirm the interface currently being used for communication by executing the following command.

   ```
   # cat /sys/class/net/bondY/bonding/active_slave
   ```

   If the displayed interface matches the SLAVE interface being replaced, execute the following command to switch the current communication interface to another SLAVE interface.

   ```
   # /sbin/ifenslave -c bondY ethZ
   ```
   (ethZ: Interface that composes bondY and does not perform hot replacement)

   Finally, remove the SLAVE interface being replaced, from the bonding configuration. Immediately after being removed, the interface is automatically no longer used.

   ```
   # /sbin/ifenslave -d bondY ethX
   ```

5. Save all the interface configuration files that you checked in step 2 by executing the following command. udevd and configuration scripts may reference the contents of files in /etc/sysconfig/network-scripts. For this reason, create a save directory and save these files to the directory so that udevd and the configuration scripts will not reference them.

   ```
   # cd /etc/sysconfig/network-scripts
   # mkdir temp
   # mv ifcfg-ethX temp
   (following also executed for bonding configuration)
   # mv ifcfg-bondX temp
   ```

6. Delete the entries associated with the replaced NIC from the udev function rule file.
   The entry to be removed is only onboard NIC for replacing IOU itself. For replacing or removing PCI Express card, the entry to be removed is the interface corresponding to the PCI Express card.

   a Confirm the correspondence between the interface name and hardware address in the table created in step 2.

   b Edit the udev function rule file, /etc/udev/rules.d/70-persistent-net.rules, to delete or comment out the entry lines of all the interface names and hardware addresses confirmed in the above step a.

   The following example shows editing of the udev function rule file.

   Example of descriptions in the file before editing

```
# PCI device 0x8086:0x1521 (igb)
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ¥
ATTR{address}=="2c:d4:44:f1:44:f0", ATTR{type}=="1",
KERNEL=="eth*", NAME="eth0"

# PCI device 0x8086:0x1521 (igb)
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ¥
ATTR{address}=="2c:d4:44:f1:44:f1", ATTR{type}=="1",
KERNEL=="eth*", NAME="eth1"
 :
 :
```

   The ¥ at the end of a line indicates that there is no line feed.

   Example of descriptions in the file after editing
   (In the example, eth0 was deleted, and eth1 is commented out.)

```
# PCI device 0x8086:0x1521 (igb)
#SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ¥
ATTR{address}=="2c:d4:44:f1:44:f1", ATTR{type}=="1",
KERNEL=="eth*", NAME="eth1"

 :
 :
```

   The ¥ at the end of a line indicates that there is no line feed.

   Do this editing for all the interfaces listed in the table created in step 2.

7. Reflect the edited rules in udev.
   udevd reads the rules described in the rule file at its start time and then retains the rules in memory. Simply changing the rule file does not mean the changed rules are reflected. Take action as follows to reflect the new rules in udev.

```
# udevadm control --reload-rules
```

iSCSI (NIC) on the IOU
If replace iSCSI (NIC) on the IOU, you have to take not only the same steps of ‘NIC on the IOU (including Onboard NIC)’ but also takes below steps in step 3 of that.

1. Perform the work for suppressing access to the iSCSI connection interface.

   a Confirm the state of multiple path by DM-MP (*1) or EMPD (*2).

   b Use the iscsiadm command to log out from the path (iqn) through which the iSCSI card to be replaced is routed, and disconnect the session.
   Example which confirms the state of session before disconnecting:

```
# /sbin/iscsiadm -m session
tcp: [1] 192.168.1.64:3260,1 iqn.2000-
09.com.fujitsu:storage-system.eternus-
dx400:00001049.cm0ca0p0
tcp: [2] 192.168.2.66:3260,3 iqn.2000-
09.com.fujitsu:storage-system.eternus-
dx400:00001049.cm1ca0p0
```

   Example which logout path going through a NIC to be replaced:

```
# /sbin/iscsiadm -m node -T iqn.2000-09.com.fujitsu:storage-
```

```
system.eternus-dx400:00001049.cm1ca0p0 -p 192.168.2.66:3260
–logout
```

c Use the iscsiadm command to confirm that the target session has been disconnected.
Example which confirms the state of session after disconnecting

```
# /sbin/iscsiadm -m session
tcp: [1] 192.168.1.64:3260,1 iqn.2000-
09.com.fujitsu:storage-system.eternus-
dx400:00001049.cm0ca0p0
```

d You can confirm the disconnection of sessions on multipath products using DM-MP or ETERNUS multidriver.
*1: Write down the DM-MP display contents at the session disconnection.
Example of DM-MP display before disconnecting path

```
# /sbin/multipath -ll
mpath1 (36000b5d0006a0000006a104900000000) dm-0
FUJITSU,ETERNUS_DX400
[size=50G][features=0][hwhandler=0][rw]
¥_ round-robin 0 [prio=2][active]
 ¥_ 3:0:0:0 sdb 8:16  [active][ready]
 ¥_ 4:0:0:0 sdc 8:32  [active][ready]
```

Example of DM-MP display after disconnecting path

```
# /sbin/multipath -ll
mpath1 (36000b5d0006a0000006a104900000000) dm-0
FUJITSU,ETERNUS_DX400
[size=50G][features=0][hwhandler=0][rw]
¥_ round-robin 0 [prio=1][enabled]
 ¥_ 3:0:0:0 sdb 8:16  [active][ready]
```

*2: See the ETERNUS Multipath Driver User's Guide (For Linux).

FC card

1. Stop the access to FC card on IOU by such a way as stopping application.

4.3.2 DR operation of IOU hot replacement

This section describes the DR operation for IOU hot replacement.

1. Execute “/opt/FJSVdp-util/sbin/dp rm IOU” command on the shell of OS.
The IOU to be removed will turn off.
Example: Turning off the IOU 3

```
# /opt/FJSVdp-util/sbin/dp rm IOU3
```

2. Login to MMB console as administrator
3. Execute “hotremove” command on MMB console.
Example: removing IOU 3 from partition 1

```
# hotremove partition 1 IOU 3 quiet
#
```

4. Pulling the IOU out from the slot of cabinet
For replacing IOU itself, insert PCI Express card mounted on old IOU to new one.
For replacing, expanding or removing PCI Express card on the IOU, do it now.
5. Inserting IOU to the slot of the cabinet.
6. Execute “hotadd” command on MMB console.
Example: Adding IOU 3 to partition 1

```
# hotadd partition 1 IOU 3 quiet
#
```

7. Execute “/opt/FJSVdp-util/sbin/dp stat IOU” command
A list of IOU included in the partition is shown. Check that added IOU is shown.
Example: adding IOU 3

```
# /opt/FJSVdp-util/sbin/dp stat IOU
IOU0: empty
IOU1: empty
IOU2: empty
IOU3: offline
```

IOU added to partition is shown as offline state because it is power-off state at this time.

8. Execute “/opt/FJSVdp-util/sbin/dp add IOU” command on the shell of OS.
   The IOU to be removed will turn on.
   Example: turning on IOU 3

```
# /opt/FJSVdp-util/sbin/dp add IOU3
```

4.3.3 Operation after IOU hot replacement

NIC on the IOU (including onboard NIC)

1. Collect the information associated with NIC on the replaced IOU.
   An interface (ethX) is created for the replaced NIC. Make a table with information including the interface name, hardware address, bus address, and location of the interface made corresponding to NIC mounted on replaced according to step1 and step 2 of the section 4.3.1 Preparation for IOU hot replacement. The interface name, hardware address and PCI bus address may change before and after replacing IOU.

   TABLE 4.3 Example of interface information about interfaces after replacement

Interface name	Hardware address	Bus address	Location
eth0	2c:d4:44:f1:44:d2	0000:86:01.0	Onboard 0
eth1	2c:d4:44:f1:44: d3	0000:86:01.1	Onboard 1
eth2	00:19:99:d7:36:5f	0000:87:00.0	PCI#0
...		...	...

   For replacing IOU itself, confirm that new hardware address is defined to NIC of onboard. Confirm that the interface name used before replacing NIC is re-assigned. New PCI bus address may be assigned. Also confirm that the relevant entries in the above-described table were automatically added to the udev function rule file, /etc/udev/rules.d/70-persistent-net.rules.
   For expanding or removing PCI Express card by replacing IOU, the number of entry in table increase or decrease.

2. Deactivate each newly created interface.
   The interfaces created for the replaced NIC may be active by turning on IOU. In such cases, you need to deactivate them before changing the interface configuration file.
   Execute the below command for all the interface names (including interfaces which are not actually replaced) on the IOU confirmed in step 1.
   Example: eth0

```
# /sbin/ifconfig eth0 down
```

3. Confirm the correspondence between the interface names before and after the NIC replacement.
   According to the table with the interface information about before and after the NIC replacement in steps 2 of 4.3.1 Preparation for IOU hot replacement and step 1 in this section, confirm that the relation between the interface name and location is correct.
   When switching interface name occurs before and after IOU replacement, make the correspondence between interface name and location into the correspondence before IOU replacement by below procedure.

   Note

   For the interface which name does not change before and after IOU replacement, this procedure does not need.

   Here shows the procedure to change the interface name of eth2 and eth3 (change eth2 to eth3, eth3 to eth2) as a specific example.

   a Edit the udev function rule file, /etc/udev/rules.d/70-persistent-net.rules, modifying the target interface name to desired name. (In this example, change eth2 to eth3, eth3 to eth2.)
     Example of descriptions in the file before editing

```
# PCI device 0x8086:0x1521 (igb)
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ¥
```

```
ATTR{address}=="00:19:99:d7:36:21", ATTR{type}=="1",
KERNEL=="eth*", NAME="eth2"
# PCI device 0x8086:0x1521 (igb)
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ¥
ATTR{address}=="00:19:99:d7:36:22", ATTR{type}=="1",
KERNEL=="eth*", NAME="eth3"
 :
 :
```

The ¥ at the end of a line indicates that there is no line feed.

Example of descriptions in the file after editing

```
# PCI device 0x8086:0x1521 (igb)
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ¥
ATTR{address}=="00:19:99:d7:36:21", ATTR{type}=="1",
KERNEL=="eth*", NAME="eth3"
# PCI device 0x8086:0x1521 (igb)
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ¥
ATTR{address}=="00:19:99:d7:36:22", ATTR{type}=="1",
KERNEL=="eth*", NAME="eth2"
 :
 :
```

The ¥ at the end of a line indicates that there is no line feed.

b Execute below command, reflecting the edited rules

```
# udevadm control --reload-rules
```

c Assert uevent to target interfaces (in this case, eth2 and eth3). Note to specify the interface name before changing at this time. For example, assert uevent with specifying eth2 when changing eth2 to eth10.

```
# echo add > /sys/class/net/eth2/uevent
# echo add > /sys/class/net/eth3/uevent
```

Interpret properly eth2 or eth3 to appropriate name.

d Check whether the interface name is changed to desired name.

4. Edit the saved interface configuration file.
Write a new hardware address to replace the old one. In "HWADDR," set the hardware address of the replacement NIC in TABLE 6.4 Example of entered values corresponding to the interface names before and after NIC replacement or TABLE 6.5 Confirmation of interface names. Also, for SLAVE under bonding, the file contents are partly different, but the lines to be set are the same.
Example:

```
DEVICE=eth0
NM_CONTROLLED=no
BOOTPROTO=static
HWADDR=2c:d4:44:f1:44:d2
BROADCAST=192.168.16.255
IPADDR=192.168.16.1
NETMASK=255.255.255.0
NETWORK=192.168.16.0
ONBOOT=yes
TYPE=Ethernet
```

Do this editing for all the saved interfaces except for the interface with no change of hardware address.

5. Restore the saved interface configuration file to the original file.
Restore the interface configuration file saved to the save directory to the original file by executing the following command.

```
# cd /etc/sysconfig/network-scripts/temp
# mv ifcfg-ethX  ..
(following also executed for bonding configuration)
# mv ifcfg-bondX  ..
```

6. Activate the replaced interface.
The method for activating a single NIC interface differs from that for activating the SLAVE interfaces

under bonding.
For a single NIC interface:
Execute the following command to activate the interface. Activate all the necessary interfaces.

```
# /sbin/ifup ethX
```

Also, if the single NIC interface has a VLAN device and the VLAN interface was temporarily removed, restore the VLAN interface. If the priority option has changed, set it again.

```
# /sbin/vconfig add ethX Y
# /sbin/ifup ethX.Y
(enter command to set VLAN option as needed)
```

For SLAVE under bonding
Execute the following command to incorporate the SLAVE interface into the existing bonding configuration. Incorporate all the necessary interfaces.

```
# /sbin/ifenslave bondY ethX
```

The VLAN-related operation is normally not required because a VLAN is created on the bonding device.

7. Remove the directory to which the interface configuration file was saved.
   After all the interfaces to be replaced have been replaced, remove the save directory created in step 5 in 4.3.1 Preparation for IOU hot replacement by executing the following command.

```
# rmdir /etc/sysconfig/network-scripts/temp
```

8. Execute the higher-level application processing required after NIC replacement.
   Perform the necessary post processing (such as starting an application or restoring changed settings) for the operations performed for the higher-level applications in step 3 in 4.3.1 Preparation for IOU hot replacement.

iSCSI (NIC) on the IOU

If replace iSCSI (NIC) on the IOU, you have to take not only the same steps of ‘NIC on the IOU (including Onboard NIC)’ but also takes below steps in step 8 of that.

1. To restore access to the iSCSI connection interface, perform the following.

   a Confirm the state of multiple path by DM-MP (*1) or EMPD (*2).

   b Use the iscsiadm command to log in to the path (iqn) through which the replacement iSCSI card is routed, and reconnect the session.
   Example which confirms the state of session before connecting:

```
# /sbin/iscsiadm -m session
tcp: [1] 192.168.1.64:3260,1 iqn.2000-
09.com.fujitsu:storage-system.eternus-
dx400:00001049.cm0ca0p0
```

   Example which login path going through a NIC to be replaced:

```
# /sbin/iscsiadm -m node -T iqn.2000-09.com.fujitsu:storage-
system.eternus-dx400:00001049.cm1ca0p0 -p 192.168.2.66:3260
–login
```

   c Use the iscsiadm command to confirm that the target session has been activated.
   Example which confirms the state of session after connecting

```
# /sbin/iscsiadm -m session
tcp: [1] 192.168.1.64:3260,1 iqn.2000-
09.com.fujitsu:storage-system.eternus-
dx400:00001049.cm0ca0p0
tcp: [3] 192.168.2.66:3260,3 iqn.2000-
09.com.fujitsu:storage-system.eternus-
dx400:00001049.cm1ca0p0
```

   d You can confirm the activation of sessions on multipath products using DM-MP or ETERNUS multidriver.
   *1: Write down the DM-MP display contents at the session activation.
   Example of DM-MP display before connecting path

```
# /sbin/multipath -ll
```

```
mpath1 (36000b5d0006a0000006a104900000000) dm-0
FUJITSU,ETERNUS_DX400
[size=50G][features=0][hwhandler=0][rw]
¥_ round-robin 0 [prio=1][active]
 ¥_ 3:0:0:0 sdb 8:16  [active][ready]
```

Example of DM-MP display after connecting path

```
# /sbin/multipath -ll
mpath1 (36000b5d0006a0000006a104900000000) dm-0
FUJITSU,ETERNUS_DX400
[size=50G][features=0][hwhandler=0][rw]
¥_ round-robin 0 [prio=2][enabled]
 ¥_ 3:0:0:0 sdb 8:16  [active][ready]
 ¥_ 5:0:0:0 sdc 8:32  [active][ready]
```

*2: See the ETERNUS Multipath Driver User's Guide (For Linux).

FC Card
Restart the application which is stop at preparing for IOU hot replacement

4.4 Hot add of IOU

This section describes the hot add of the IOU.

4.4.1 Preparation for IOU hot add

The description of the flow of preparations is given below.

1. Arrange for the IOU for addition.
2. Check if number of IOU required for addition is available.
3. Insert the IOU to be added into a free IOU slot.

Note
Check if the I/O device is normally operating in the free partition. During addition, I/O pre-diagnostic process is not executed.

4.4.2 DR operation of IOU hot add

This section describes the DR operation for IOU hot add.

1. Log into the MMB Web-UI using Administrator privileges.
2. Execute the hotadd command.

Example：When adding IOU1 in partition1.

```
# hotadd partition 1 IOU 1 quiet
#
```

3. Execute /opt/FJSVdp-util/sbin/dp stat IOU command in the operating system shell.
   The list of IOUs connected to the system is displayed. Check if the IOU that was added is displayed.
   Example： When IOU1 is added.

```
# /opt/FJSVdp-util/sbin/dp stat IOU
IOU0: online
IOU1: offline
IOU2: empty
IOU3: empty
```

   When newly adding an IOU to a partition, it will be displayed as offline since the IOU is not recognized by the operating system.

4. Execute /opt/FJSVdp-util/sbin/dp add IOU1 command in the operating system shell.
   The IOU that was newly added to the partition will be powered on.
   Example：When IOU1 is powered on

```
# /opt/FJSVdp-util/sbin/dp add IOU1
```

4.4.3 Operation after IOU hot add

This section describes the process and operation after IOU hot add.

1. Check the resource that was added.
   Execute the /opt/FJSVdp-util/sbin/dp show IOU command in the operating system shell.
   Example：When IOU1 was added

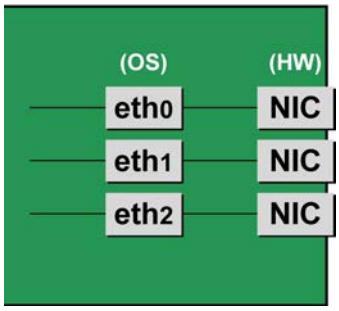
```
# /opt/FJSVdp-util/sbin/dp show IOU1
0000:03:00.0 PCI bridge: PLX Technology, Inc. Device 8748
(rev ca)
0000:04:09.0 PCI bridge: PLX Technology, Inc. Device 8748
(rev ca)
0000:05:00.0 PCI bridge: PLX Technology, Inc. Device 8748
(rev ca)
0000:06:02.0 PCI bridge: PLX Technology, Inc. Device 8748
(rev ca)
0000:06:08.0 PCI bridge: PLX Technology, Inc. Device 8748
(rev ca)
0000:06:09.0 PCI bridge: PLX Technology, Inc. Device 8748
(rev ca)
0000:06:10.0 PCI bridge: PLX Technology, Inc. Device 8748
(rev ca)
0000:06:11.0 PCI bridge: PLX Technology, Inc. Device 8748
(rev ca)
0000:0a:00.0 Ethernet controller: Intel Corporation I350
Gigabit
Network Connection (rev 01)
0000:0a:00.1 Ethernet controller: Intel Corporation I350
Gigabit
Network Connection (rev 01)
0000:0d:00.0 Ethernet controller: Intel Corporation I350
Gigabit
Network Connection (rev 01)
0000:0d:00.1 Ethernet controller: Intel Corporation I350
Gigabit
Network Connection (rev 01)
0000:10:00.0 Fibre Channel: Emulex Corporation Saturn-X:
LightPulse
Fibre Channel Host Adapter (rev 03)
0000:10:00.1 Fibre Channel: Emulex Corporation Saturn-X:
LightPulse
Fibre Channel Host Adapter (rev 03)
0000:27:00.0 PCI bridge: PLX Technology, Inc. Device 8764
(rev aa)
0000:28:01.0 PCI bridge: PLX Technology, Inc. Device 8764
(rev aa)
0000:28:04.0 PCI bridge: PLX Technology, Inc. Device 8764
(rev aa)
0000:28:05.0 PCI bridge: PLX Technology, Inc. Device 8764
(rev aa)
0000:28:08.0 PCI bridge: PLX Technology, Inc. Device 8764
(rev aa)
0000:28:09.0 PCI bridge: PLX Technology, Inc. Device 8764
(rev aa)
0000:28:0c.0 PCI bridge: PLX Technology, Inc. Device 8764
(rev aa)
0000:28:0d.0 PCI bridge: PLX Technology, Inc. Device 8764
(rev aa)
```

2. Make the configuration file for being able to use added resources on OS.
   Example: making the configuration file for the interface to use onboard NIC on IOU.

4.5 IOU hot remove

The description of the flow of the preparation is as follows.
Note

- If iSCSI (NIC) is mounted on an IOU, hot replacement of the IOU can be performed only if all of below conditions are satisfied.
  - DM-MP (Device-Mapper Multipath) or ETERNUS multi driver (EMPD) is used for storage connection.
  - Multiple path is made with a NIC on the IOU to be replaced and a NIC on an IOU other than the IOU to be replaced.
  - A NIC on the IOU to be replaced makes an interface independently.
    Example of single interface:



  - If FC card used for SAN boot is mounted on an IOU to be replaced, hot replacement of the IOU cannot be performed.

4.5.1 Preparation for IOU hot remove

The description of the flow of the preparation is as follows.

Note
When the disk connected via the IOU to be removed is used as the dump saving area if kdump, the dump environment is changed to enable the use of another disk.

1. When the IOU is removed, the PCI Express card, which is mounted on the IOU is also removed. Confirm that there is no software where the PCI Express card is used, and implement any of the following measures.

   a. Before removing, stop the software in which the PCI Express card to be removed is being used.

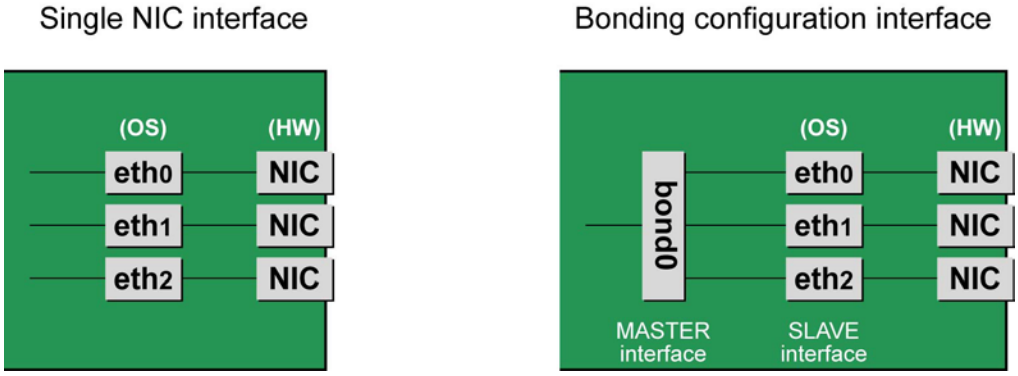
   b. The PCI Express card is to be outside the software operation target.

   To confirm the resources mounted on the target IOU, execute /opt/FJSVdp-util/sbin/dp show IOU command from the operating system shell.
   Example：When checking IOU3.

```
# /opt/FJSVdp-util/sbin/dp show IOU3
0000:82:00.0 PCI bridge: PLX Technology, Inc. Device 8748
(rev ca)
0000:83:09.0 PCI bridge: PLX Technology, Inc. Device 8748
(rev ca)
0000:84:00.0 PCI bridge: PLX Technology, Inc. Device 8748
(rev ca)
0000:85:02.0 PCI bridge: PLX Technology, Inc. Device 8748
(rev ca)
0000:85:08.0 PCI bridge: PLX Technology, Inc. Device 8748
(rev ca)
0000:85:09.0 PCI bridge: PLX Technology, Inc. Device 8748
(rev ca)
0000:85:10.0 PCI bridge: PLX Technology, Inc. Device 8748
(rev ca)
0000:85:11.0 PCI bridge: PLX Technology, Inc. Device 8748
(rev ca)
```

```
0000:89:00.0 Ethernet controller: Intel Corporation I350
Gigabit
Network Connection (rev 01)
0000:89:00.1 Ethernet controller: Intel Corporation I350
Gigabit
Network Connection (rev 01)
0000:8c:00.0 Ethernet controller: Intel Corporation I350
Gigabit
Network Connection (rev 01)
0000:8c:00.1 Ethernet controller: Intel Corporation I350
Gigabit
Network Connection (rev 01)
0000:8f:00.0 Fibre Channel: Emulex Corporation Saturn-X:
LightPulse
Fibre Channel Host Adapter (rev 03)
0000:8f:00.1 Fibre Channel: Emulex Corporation Saturn-X:
LightPulse
Fibre Channel Host Adapter (rev 03)
```

NIC on the IOU (including onboard NIC)
The procedure describes operations where a single NIC is configured as one interface. It also describes cases where multiple NICs are bonded together to configure one interface (bonding configuration). For bonding multiple NIC by using PRIMECLUSTER Global Link Services (GLS), see 'PRIMECLUSTER Global Link Service Configuration and Administration Guide Redundant Line Control Function' (J2UZ-7781).



Notes

- To perform hot replacement in a system where a bonding device is installed, design the system so that it specifies ONBOOT=YES in all interface configuration files (the /etc/sysconfig/network-scripts/ifcfg-eth*files and the /etc/sysconfig/network-scripts/ifcfg-bond*files), regardless of whether the NIC to be replaced is a configuration interface of the bonding device.
  An IP address does not need to be assigned to unused interfaces. This procedure is for preventing the device name of the replacement target NIC from being changed after hot replacement. If ONBOOT=NO also exists, the procedure described here may not work properly.

1. Confirm where the NIC is mounted.
   Confirm the correspondence between PCI Address and interface name of NIC mounted in the IOU which is confirmed by above "dp show IOU" command.
   Example: When PCI Address is "0000:89:00.0".

```
# ls -l /sys/class/net/*/device | grep "0000:89:00.0"
lrwxrwxrwx. 1 root root 0 Aug 27 16:06 2013
/sys/class/net/eth0/
device ¥
-> ../../../ 0000:89:00.0
```

   The ¥ at the end of a line indicates that there is no line feed.

   In this case, eth0 is the interface name which is correspondent to PCI bus address "0000:89:00.0".

   Note
   You will use the bus address obtained here in steps 2 and procedure after IOU replacement. Record the bus address so that you can reference it later.

   Next, check the PCI slot number for this PCI bus address.

Execute “ethtool -p” command, making the LED of NIC blinked. Check IOU or PCI_box connected to the IOU, checking in which slots the NIC is mounted, (e.g. PCI#0)

Example: Blinking the LED of the NIC corresponding to interface “eth0” for ten seconds.

```
# /sbin/ethtool p eth0 10
```

2. Make a table with information including interface name, hardware address and PCI bus address of NIC mounted on IOU to be replaced.
   Make a below table with information of IOU to be replaced within information which is got by step 1.

TABLE 4.4 Correspondence between bus addresses and interface names

Interface name	Hardware address	Bus address	Location
eth0		0000:89:01.0	Onboard 0
eth1		0000:89:01.1	Onboard 1
eth2		0000:8f:00.0	PCI#0
...		...	...

Note
When recording a bus address, include the function number (number after the period).

- Confirm the correspondence between the interface name and hardware address
  Execute below command, checking the correspondence between the interface name and the hardware address.
  Example: eth0 for a single interface

```
# cat /sys/class/net/eth0/address
2c:d4:44:f1:44:f0
```

Example: eth0 for a bonding interface

```
# cat /proc/net/bonding/bondY
Ethernet Channel Bonding Driver .........
.
.
Slave interface: eth0
.
Permanent HW addr: 2c:d4:44:f1:44:f0
.
.
```

You can use this procedure only when the bonding device is active. If the bonding device is not active or the slave has not been incorporated, use the same procedure as for a single interface.

Also, the correspondence between the interface name and hardware address is automatically registered by the system in the udev function rule file, /etc/udev/rules.d/70-persistent-net.rules. Confirm that the ATTR{address} and NAME items have the same definitions as in the above output.

Example: eth0

```
grep eth0 /etc/udev/rules.d/70-persistent-net.rules

SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ¥
ATTR{address}=="2c:d4:44:f1:44:f0", ATTR{type}=="1", ¥
KERNEL=="eth*", NAME="eth0"
```

The ¥ at the end of a line indicates that there is no line feed.

You can always obtain the correct hardware address from the description in etc/udev/rules.d/70-persistent-net.rules regardless of whether the interface is incorporated in bonding.

Confirm the hardware address of other interfaces by repeating the operation with the same command. The following table lists examples of descriptions.

TABLE 4.5 Hardware address description examples

Interface name	Hardware address	Bus address	Location
eth0	2c:d4:44:f1:44:f0	0000:89:01.0	Onboard 0
eth1	2c:d4:44:f1:44:f1	0000:89:01.1	Onboard 1
eth2	00:19:99:d7:36:5f	0000:8f:00.0	PCI#0
...		...	...

3. Execute the higher-level application processing required before NIC replacement.
   Stop all access to the interface as follows. Stop the application that was confirmed in step 2 as using the interface, or exclude the interface from the target of use by the application.

4. Deactivate the NIC.
   Execute the following command to deactivate all the interfaces that you confirmed in step 2. The applicable command depends on whether the target interface is a single NIC interface or the SLAVE interface of a bonding device.

   For a single NIC interface:

   ```
   # /sbin/ifdown ethX
   ```

   If the single NIC interface has a VLAN device, you also need to remove the VLAN interface. Perform the following operations (before deactivating the real interface).

   ```
   # /sbin/ifdown ethX.Y
   # /sbin/vconfig rem ethX.Y
   ```

   For the SLAVE interface of a bonding device:

   If the bonding device is operating in mode 1, use the following steps to exclude safely SLAVE interface to be replaced from operation. In any other mode, removing it immediately should not cause any problems. Confirm that the SLAVE interface to be replaced is the interface currently being used for communication. First, confirm the interface currently being used for communication by executing the following command.

   ```
   # cat /sys/class/net/bondY/bonding/active_slave
   ```

   If the displayed interface matches the SLAVE interface being replaced, execute the following command to switch the current communication interface to another SLAVE interface.

   ```
   # /sbin/ifenslave -c bondY ethZ
   ```
   (ethZ: Interface that composes bondY and does not perform hot replacement)

   Finally, remove the SLAVE interface being replaced, from the bonding configuration. Immediately after being removed, the interface is automatically no longer used.

   ```
   # /sbin/ifenslave -d bondY ethX
   ```

5. Remove the interface configuration file..
   Delete the configuration files of all the interfaces confirmed in step 2, by executing the following command.

   ```
   # rm /etc/sysconfig/network-scripts/ifcfg-ethX
   ```

6. Delete the entries associated with the replaced NIC from the udev function rule file.
   The entry to be removed is only onboard NIC for replacing IOU itself. For replacing or removing PCI Express card, the entry to be removed is the interface corresponding to the PCI Express card.

   a Confirm the correspondence between the interface name and hardware address in the table created in step 2.

   b Edit the udev function rule file, /etc/udev/rules.d/70-persistent-net.rules, to delete or comment out the entry lines of all the interface names and hardware addresses confirmed in the above step a.

   The following example shows editing of the udev function rule file.

   Example of descriptions in the file before editing

   ```
   # PCI device 0x8086:0x1521 (igb)
   SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ¥
   ATTR{address}=="2c:d4:44:f1:44:f0", ATTR{type}=="1",
   KERNEL=="eth*", NAME="eth0"

   # PCI device 0x8086:0x1521 (igb)
   ```

```
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ¥
ATTR{address}=="2c:d4:44:f1:44:f1", ATTR{type}=="1",
KERNEL=="eth*", NAME="eth1"
 :
 :
```

The ¥ at the end of a line indicates that there is no line feed.

Example of descriptions in the file after editing
(In the example, eth0 was deleted, and eth1 is commented out.)

```
# PCI device 0x8086:0x1521 (igb)
#SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ¥
ATTR{address}=="2c:d4:44:f1:44:f1", ATTR{type}=="1",
KERNEL=="eth*", NAME="eth1"

 :
 :
```

The ¥ at the end of a line indicates that there is no line feed.

Do this editing for all the interfaces listed in the table created in step 2.

7. Reflect the edited rules in udev.
udevd reads the rules described in the rule file at its start time and then retains the rules in memory. Simply changing the rule file does not mean the changed rules are reflected. Take action as follows to reflect the new rules in udev.

```
# udevadm control --reload-rules
```

iSCSI (NIC) on the IOU
If replace iSCSI (NIC) on the IOU, you have to take not only the same steps of ‘NIC on the IOU (including Onboard NIC)’ but also takes below steps in step 3 of that.

1. Perform the work for suppressing access to the iSCSI connection interface.

   a Confirm the state of multiple path by DM-MP (*1) or EMPD (*2).

   b Use the iscsiadm command to log out from the path (iqn) through which the iSCSI card to be replaced is routed, and disconnect the session.
   Example which confirms the state of session before disconnecting:

```
# /sbin/iscsiadm -m session
tcp: [1] 192.168.1.64:3260,1 iqn.2000-
09.com.fujitsu:storage-system.eternus-
dx400:00001049.cm0ca0p0
tcp: [2] 192.168.2.66:3260,3 iqn.2000-
09.com.fujitsu:storage-system.eternus-
dx400:00001049.cm1ca0p0
```

   Example which logout path going through a NIC to be replaced:

```
# /sbin/iscsiadm -m node -T iqn.2000-09.com.fujitsu:storage-
system.eternus-dx400:00001049.cm1ca0p0 -p 192.168.2.66:3260
–logout
```

   c Use the iscsiadm command to confirm that the target session has been disconnected.
   Example which confirms the state of session after disconnecting

```
# /sbin/iscsiadm -m session
tcp: [1] 192.168.1.64:3260,1 iqn.2000-
09.com.fujitsu:storage-system.eternus-
dx400:00001049.cm0ca0p0
```

   d You can confirm the disconnection of sessions on multipath products using DM-MP or ETERNUS multidriver.
   *1: Write down the DM-MP display contents at the session disconnection.
   Example of DM-MP display before disconnecting path

```
# /sbin/multipath -ll
mpath1 (36000b5d0006a0000006a104900000000) dm-0
FUJITSU,ETERNUS_DX400
```

```
 [size=50G][features=0][hwhandler=0][rw]
 ¥_ round-robin 0 [prio=2][active]
  ¥_ 3:0:0:0 sdb 8:16  [active][ready]
  ¥_ 4:0:0:0 sdc 8:32  [active][ready]
```

Example of DM-MP display after disconnecting path

```
# /sbin/multipath -ll
mpath1 (36000b5d0006a0000006a104900000000) dm-0
FUJITSU,ETERNUS_DX400
[size=50G][features=0][hwhandler=0][rw]
¥_ round-robin 0 [prio=1][enabled]
 ¥_ 3:0:0:0 sdb 8:16  [active][ready]
```

*2: See the ETERNUS Multipath Driver User's Guide (For Linux).

FC card

1. Stop the access to FC card on IOU by such a way as stopping application.

4.5.2 DR operation of IOU hot remove

This section describes DR operation for executing IOU hot remove.

1. Execute the /opt/FJSVdp-util/sbin/dp rm IOU command from the operating system shell. The IOU to be removal will be powered off.
   Example：To power off IOU3.

   ```
   # /opt/FJSVdp-util/sbin/dp rm IOU3
   ```

2. Log into the MMB Web-UI using Administrator privileges.
3. Execute hotremove command.
   Example：When removing IOU3 from partition1

   ```
   # hotremove partition 1 IOU 3 quiet
   #
   ```

4.5.3 Operation after IOU hot remove

This section describes the process and operation after IOU hot remove.

IOU removed from the partition has become “free state” where it does not belong to any partition. You can perform below operations:

- Pull up the IOU from the cabinet physically.
- Integrate the IOU into other inactive partition.
- Hot add the IOU into other active partition.

Perform the necessary post processing (such as re-starting an application) for the operations performed for the higher-level applications in 4.5.1 Preparation for IOU hot remove.

NIC on the IOU (including onboard NIC)

1. Restart the application which is stop at preparing for IOU hot replacement

FC Card

1. Restart the application which is stop at preparing for IOU hot replacement

4.6 Hot Replacement of PCI Express Cards

This section describes the following methods of PCI Express card replacement with the PCI Hot Plug (PHP) function:

- Common replacement operations for all PCI Express cards such as power supply operations
- Specific operations added to procedures to use a specified card function or a driver for installation

There are two ways to perform PCI hot plug:

- Operation by using sysfs
- Operation by using dp commands

You can perform the operation by using dp commands if Dynamic Reconfiguration utility is installed in the partition. If not, be sure to use the operation by using sysfs. Although you can perform the operation by using sysfs even if Dynamic Reconfiguration utility is installed in the partition, it is recommended to perform the operation by using dp commands to prevent wrong operation.
Hereafter, description about the operation by using dp commands starts at 'For the partition with Dynamic Reconfiguration utility installed' and description about the operation by sysfs starts at 'For the partition without Dynamic Reconfiguration utility installed'.

Notes
If you replace PCI Express cards on an IOU, see '4.3 Hot replacement of IOU'.
Remarks
For details on the card replacement procedures not described in this chapter, see the respective product manuals.

4.6.1 Overview of common replacement procedures for PCI Express cards

This section provides an overview of common replacement procedures for all PCI Express cards.

1. Performing the required operating system and software operations depending on the PCI Express card type
2. Powering off a PCI slot
3. Replacing a PCI card
   This step is performed by the field engineer in charge of your system.
4. Powering on a PCI slot
5. Performing the required operating system and software operations depending on the PCI card type

Note
This chapter provides instructions (e.g., commands, configuration file editing) for the operating system and subsystems. Be sure to refer to the respective product manuals to confirm the command syntax and impact on the system before performing tasks with those instructions.
The following sections describe card addition, removal, and replacement with the required instructions (e.g., commands, configuration file editing) for the operating system and subsystems, together with the actual hardware operations. Step 3 is performed by the field engineer in charge of your system.

4.6.2 PCI Express card replacement procedure in detail

This section describes how to replace a PCI Express card.

Preparing the software using a PCI Express card

When a PCI Express card is replaced or removed, there must be no software using the PCI Express card. For this reason, before replacing the PCI Express card, stop the software using the PCI Express card or make the software operations inapplicable.

Confirming the slot number of a PCI Express slot

When replacing, adding or removing a PCI Express card, you need to manipulate the power supply to the appropriate slot, through the operating system. First, use the following procedure to obtain the slot number from the mounting location of the PCI Express slot for the card. It will be used to manipulate the power supply.

1. Identify the mounting location of the PCI Express card to be replaced.
   See the figure in "B.1 Physical Mounting Locations of Components" to check the mounting location (board and slot) of the PCI Express card to be replaced.
2. Obtain the slot number of the mounting location.
   Check the table in "D.2 Correspondence between PCI Slot Mounting Locations and Slot Numbers", and obtain the slot number that is unique in the cabinet and assigned to the confirmed mounting locations.

This slot number is the identification information for operating the slot of the PCI Express card to be replaced.

Note
The four-digit decimal numbers shown in <Slot number> in D.2 Correspondence between PCI Slot Mounting Locations and Slot Numbers have the leading digits filled with zeroes. The actual slot numbers do not include the zeroes in the leading digits.

Checking the power status of a PCI Express slot

- For the partition with Dynamic Reconfiguration utility installed
  Execute /opt/FJSVdp-util/sbin/dp stat pcie command on the shell of OS.
  After the list of the power status of PCI Express slots is shown, see the power status of the slot with the slot number which you confirmed at “Confirming the slot number of a PCI Express slot”
  Example:

```
# /opt/FJSVdp-util/sbin/dp stat pcie
pcie20: online
pcie21: offline
pcie22: empty
```

- For the partition without Dynamic Reconfiguration utility installed
  Using the PCI Express slot number confirmed in “Confirming the slot number of a PCI Express slot”, confirm that the /sys/bus/pci/ slots directory contains a directory for this slot information, which will be referenced and otherwise used. Below, the PCI Express slot number confirmed in Confirming the slot number of a PCI Express slot is shown at <slot number> location in the directory path in the following format, where the directory is the operational target.

```
/sys/bus/pci/slots/<slot number>
```

  Confirm that the PCI Express card in the slot is enabled or disabled by displaying the "power" file contents in this directory.

```
# cat /sys/bus/pci/slots/<slot number>/power
```

  When displayed, "0" means disabled, and "1" means enabled.

Powering on and off PCI Express slots

- For the partition with Dynamic Reconfiguration utility installed
  Execute /opt/FJSVdp-util/sbin/dp rm pcie<slot number> command on the shell of OS.
  The PCI Express card is disabled and has become to be ready for removal. The LED goes out.
  Example: Making the PCI Express slot with PCI Express slot number 20 power off

```
# /opt/FJSVdp-util/sbin/dp rm pcie20
```

  This operation concurrently removes the device associated with the relevant adapter from the system.

  Execute /opt/FJSVdp-util/sbin/dp add pcie<slot number> command on the shell of OS to power on the target slot and enable the PCI Express card on the slot. The PCI Express card becomes available again.
  Example:

```
# /opt/FJSVdp-util/sbin/dp add pcie20
```

  This operation concurrently installs the device associated with the relevant adapter on the system. After power-on, you need to confirm that the card and driver are correctly installed. The procedures vary depending on the card and driver specifications. For the appropriate procedures, see the respective manuals.

- For the partition without Dynamic Reconfiguration utility installed
  You can power on and off a PCI Express slot through an operation on the file confirmed in “Checking the power status of a PCI Express slot”.
  To disable a PCI Express card and make it ready for removal, write "0" to the "power" file in the directory corresponding to the target slot. The LED goes out.

```
# echo 0 > /sys/bus/pci/slots/<slot number>/power
```

  This operation concurrently removes the device associated with the relevant adapter from the system.

  To enable the card again and make it available, write "1" to the "power" file in the directory corresponding to the disabled slot.

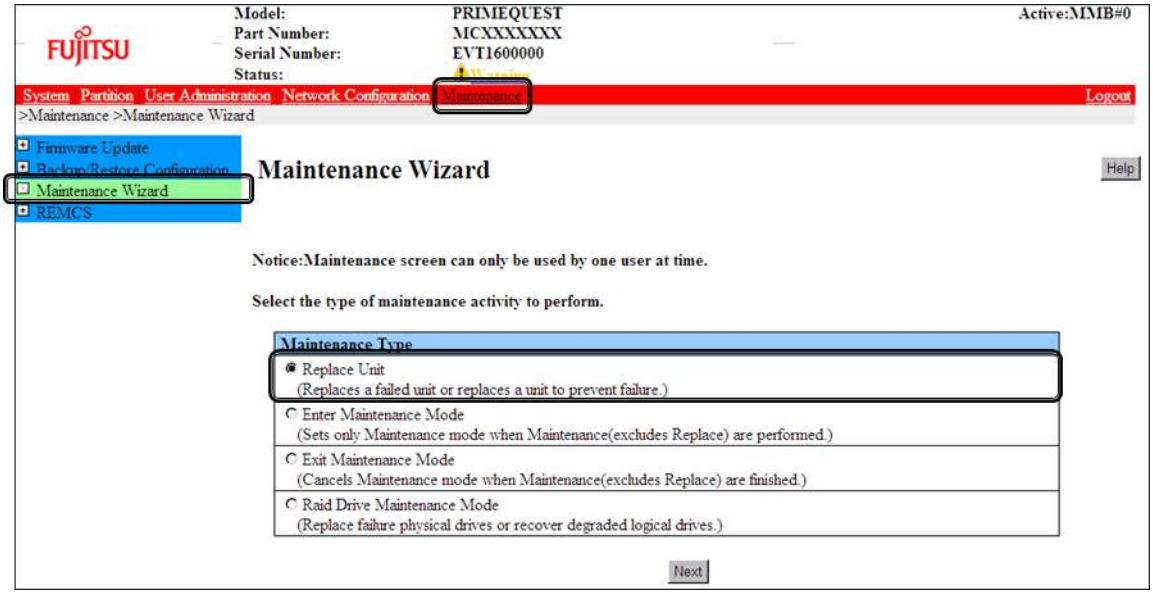
```
# echo 1 > /sys/bus/pci/slots/<slot number>/power
```

This operation concurrently installs the device associated with the relevant adapter on the system. After power-on, you need to confirm that the card and driver are correctly installed. The procedures vary depending on the card and driver specifications. For the appropriate procedures, see the respective manuals.

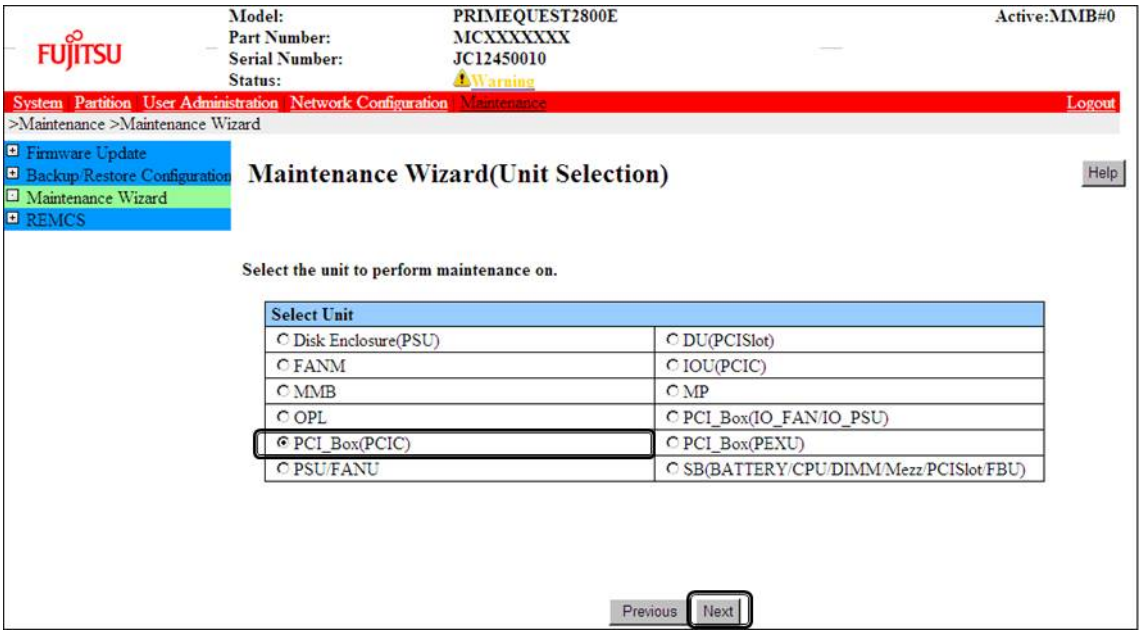
Operation for Hot replacement of PCI Express card by Maintenance Wizard

This item describes Operation for Hot replacement of PCI Express card (PCIC) by Maintenance Wizard Below works are performed by the field engineer in charge of your system.

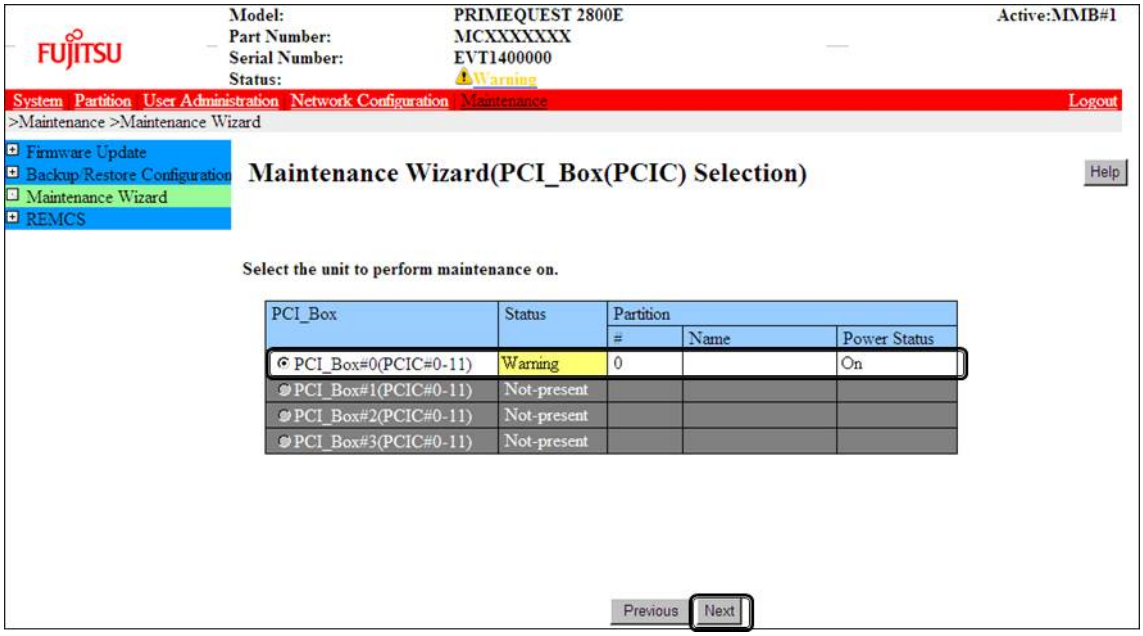
1. Start [Maintenance Wizard] menu by MMB Web-UI and display [Maintenance Wizard] view.
2. Select [Replace Unit] and click [Next].


Model: PRIMEQUEST
Part Number: MCXXXXXXX
Serial Number: EVT1600000
Status:
Active:MMB#0
System Partition User Administration Network Configuration Maintenance Logout
>Maintenance >Maintenance Wizard
Firmware Update
Backup/Restore Configuration
Maintenance Wizard
REMCS
Maintenance Wizard
Help
Notice:Maintenance screen can only be used by one user at time.
Select the type of maintenance activity to perform.
Maintenance Type
Replace Unit
(Replaces a failed unit or replaces a unit to prevent failure.)
Enter Maintenance Mode
(Sets only Maintenance mode when Maintenance(excludes Replace) are performed.)
Exit Maintenance Mode
(Cancels Maintenance mode when Maintenance(excludes Replace) are finished.)
Raid Drive Maintenance Mode
(Replace failure physical drives or recover degraded logical drives.)
Next

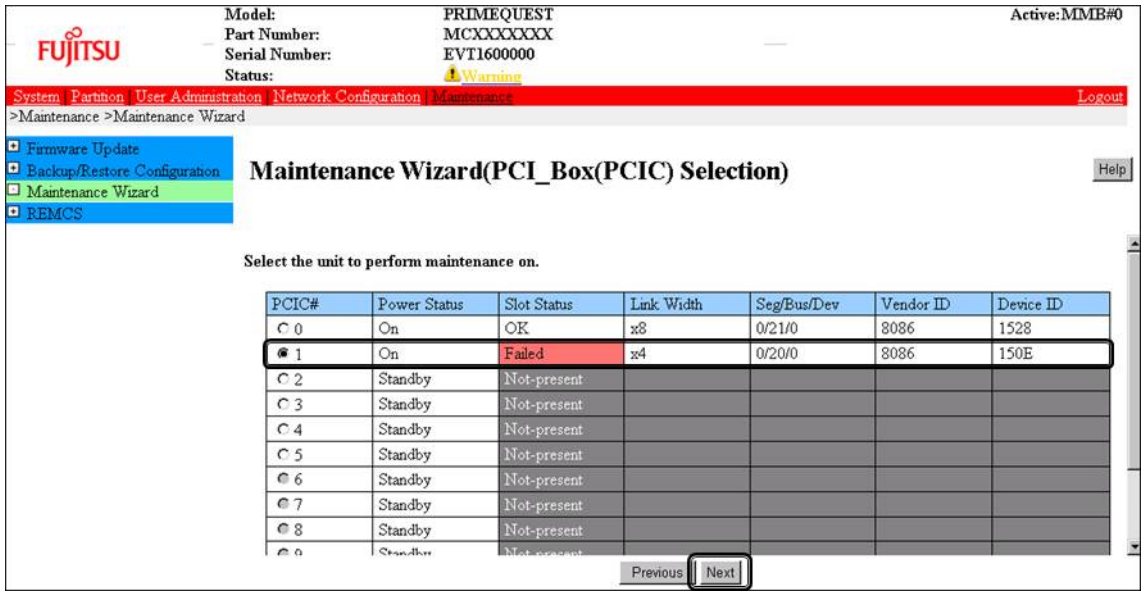
3. Select [PCI_Box(PCIC)], click [Next].



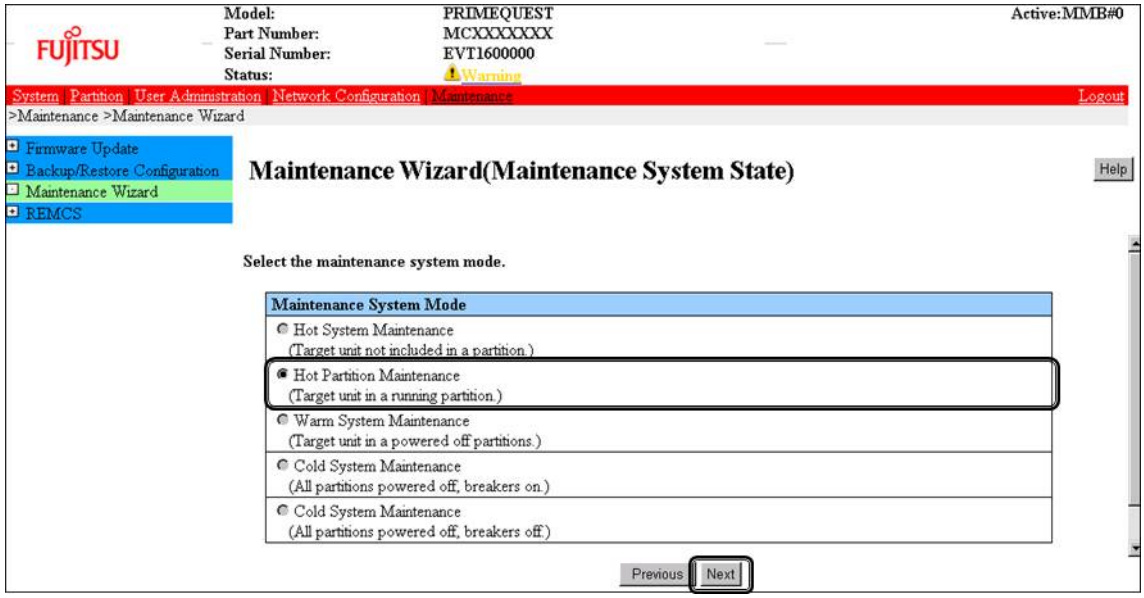
4. Select the radio button of PCI_Box with the particular number, click [Next]
   Example of operation for hot replacing PCI Express card of PCIC#1 mounted on PCI_Box#0



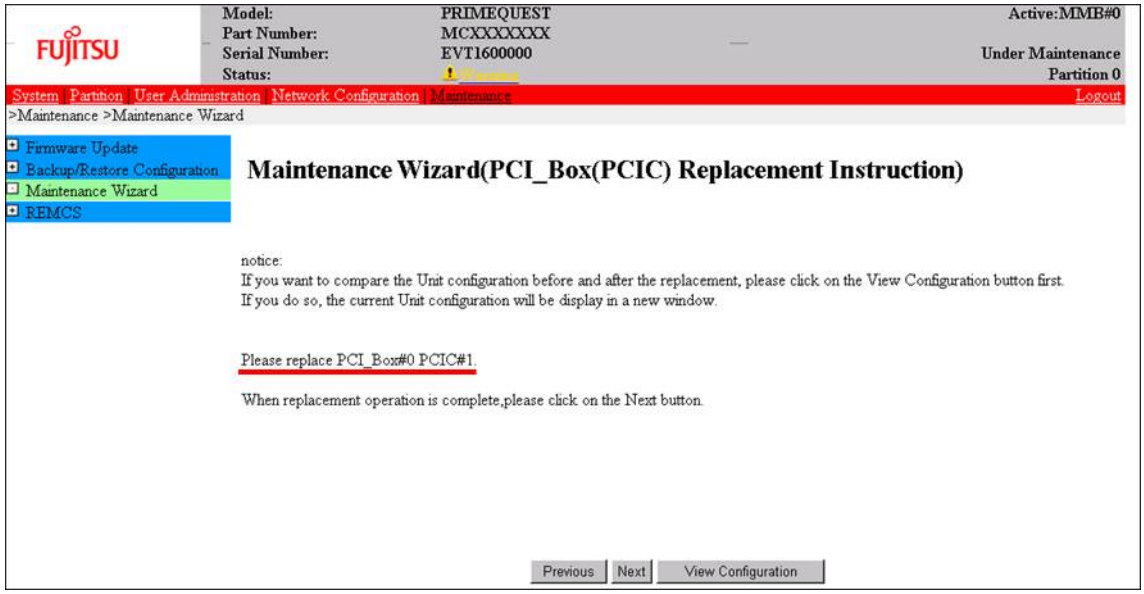
5. Select the radio button of the particular PCIC number and click [Next]



6. Select [Hot Partition Maintenance (Target unit in a running partition.)] and click [Next]

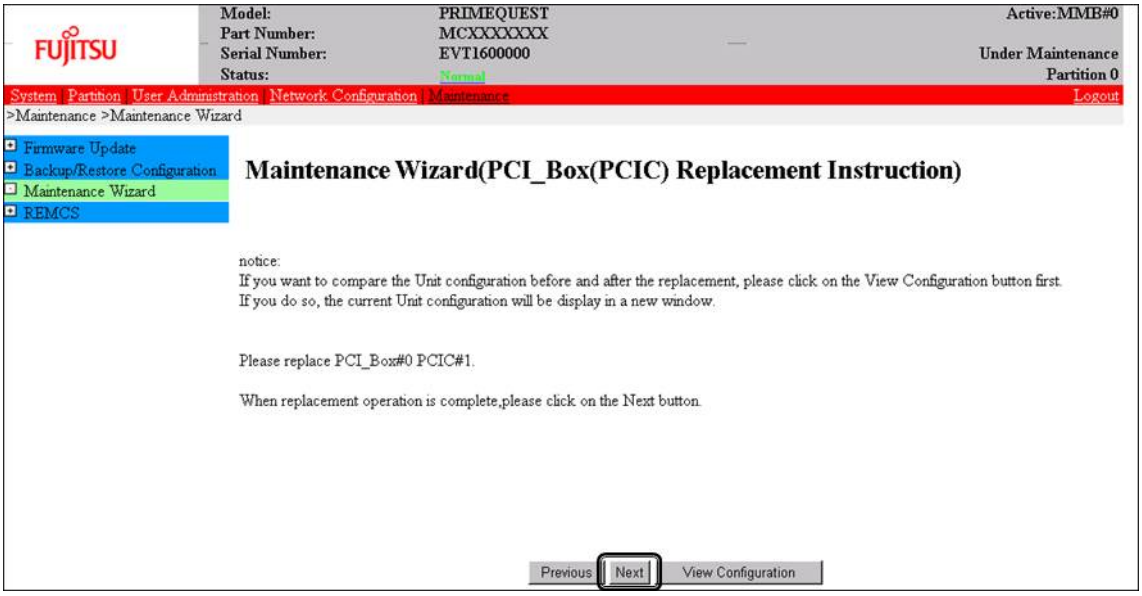


7. Maintenance mode is set (with information area of MMB Web-UI gray out) and then replacement instruction for the particular PCIC appears. Replace it with this window displayed.
   See the figure in 'B.1 Physical Mounting Locations of Components' to confirm the location of the PCI Express card to be replaced.


Model: PRIMEQUEST
Part Number: MCXXXXXXX
Serial Number: EVT1600000
Status: Warning
Active:MMB#0
Under Maintenance
Partition 0
System | Partition | User Administration | Network Configuration | Maintenance
Logout
>Maintenance >Maintenance Wizard
Firmware Update
Backup/Restore Configuration
Maintenance Wizard
REMCS
Maintenance Wizard(PCI_Box(PCIC) Replacement Instruction)
notice:
If you want to compare the Unit configuration before and after the replacement, please click on the View Configuration button first.
If you do so, the current Unit configuration will be display in a new window.
Please replace PCI_Box#0 PCIC#1.
When replacement operation is complete,please click on the Next button.
Previous
Next
View Configuration

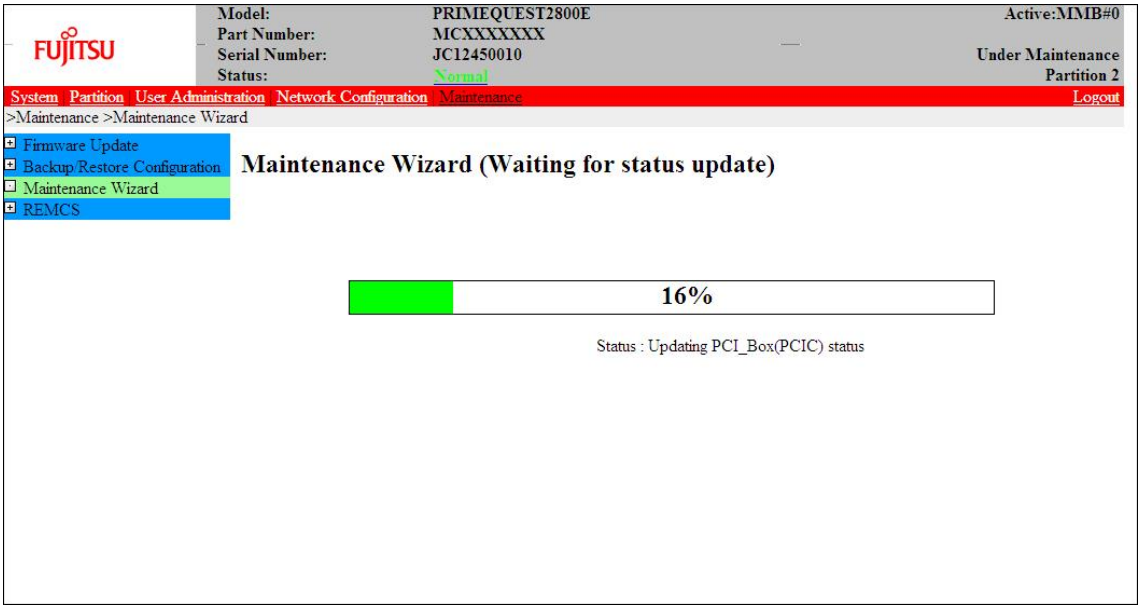
Note
Do NOT click [Next] until replacing the PCIC.

8. After replacing the particular PCIC and powering on the particular PCIC slot, click [Next].
   For how to power on the PCIC slot, see "Powering on and off PCI Express slots" in "4.6.2 PCI Express card replacement procedure in detail".
   It is the administrator of your system who power off the PCI Express slot.

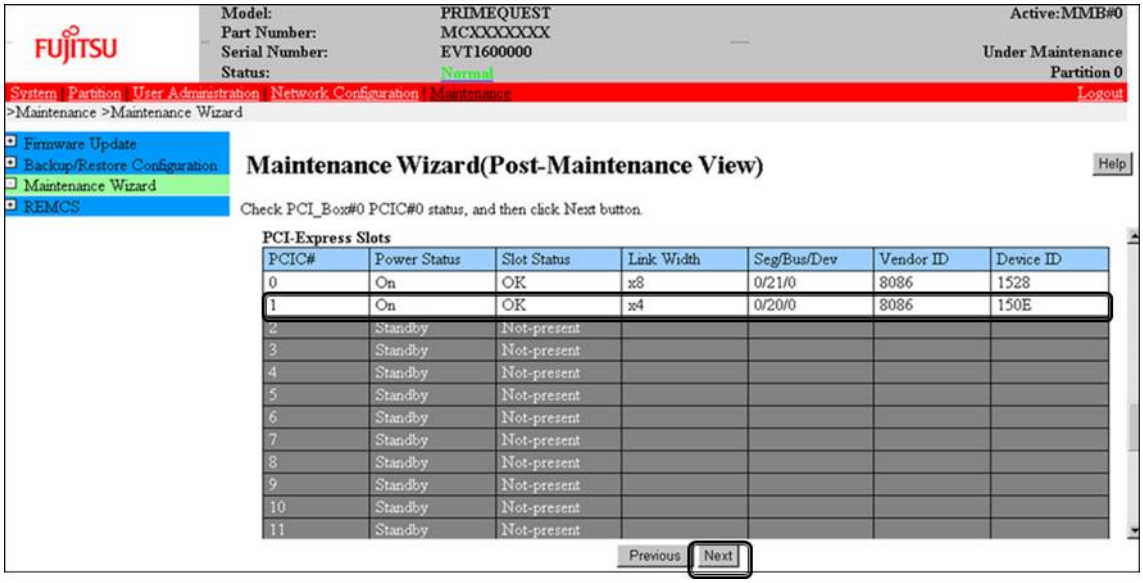

Model: PRIMEQUEST
Part Number: MCXXXXXXX
Serial Number: EVT1600000
Status: Normal
Active:MMB#0
Under Maintenance
Partition 0
System | Partition | User Administration | Network Configuration | Maintenance
Logout
>Maintenance >Maintenance Wizard
Firmware Update
Backup/Restore Configuration
Maintenance Wizard
REMCS
Maintenance Wizard(PCI_Box(PCIC) Replacement Instruction)
notice:
If you want to compare the Unit configuration before and after the replacement, please click on the View Configuration button first.
If you do so, the current Unit configuration will be display in a new window.
Please replace PCI_Box#0 PCIC#1.
When replacement operation is complete,please click on the Next button.
Previous
Next
View Configuration

Note
Ask the administrator of your system to power on the PCI Express slot.

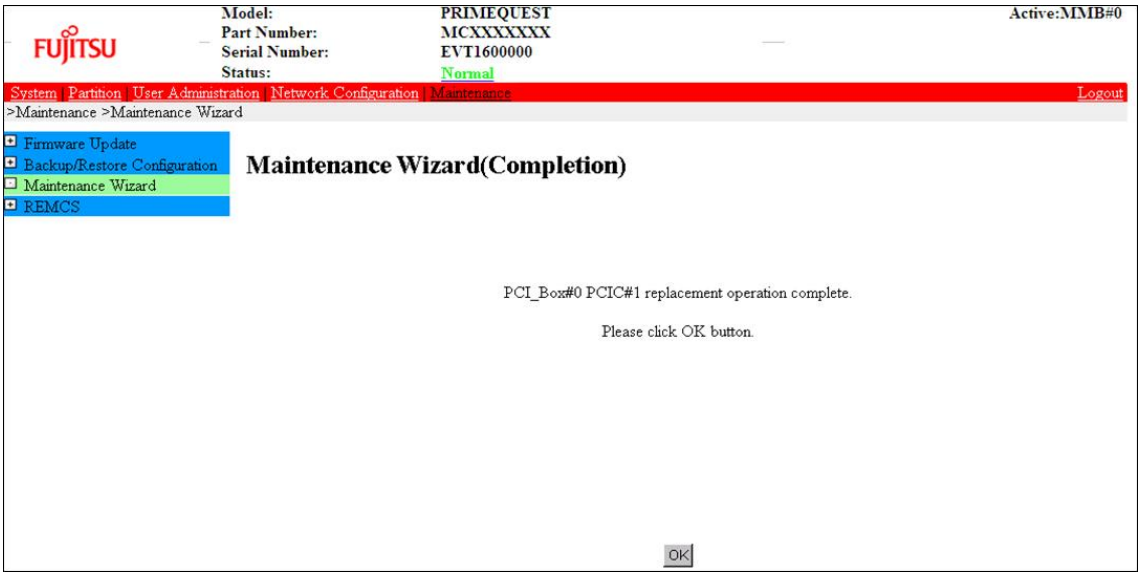
9. The window updating status appears.



10. Check the status of replaced PCIC and click [Next].


Model: PRIMEQUEST
Part Number: MCXXXXXXX
Serial Number: EVT1600000
Status: Normal
Active:MMB#0
Under Maintenance
Partition 0
System | Partition | User Administration | Network Configuration | Maintenance
Logout
>Maintenance >Maintenance Wizard
Firmware Update
Backup/Restore Configuration
Maintenance Wizard
REMCS
Maintenance Wizard(Post-Maintenance View)
Help
Check PCI_Box#0 PCIC#0 status, and then click Next button.
PCI-Express Slots
PCIC# | Power Status | Slot Status | Link Width | Seg/Bus/Dev | Vendor ID | Device ID
0 | On | OK | x8 | 0/21/0 | 8086 | 1528
1 | On | OK | x4 | 0/20/0 | 8086 | 150E
2 | Standby | Not-present
3 | Standby | Not-present
4 | Standby | Not-present
5 | Standby | Not-present
6 | Standby | Not-present
7 | Standby | Not-present
8 | Standby | Not-present
9 | Standby | Not-present
10 | Standby | Not-present
11 | Standby | Not-present
Previous
Next

11. Confirm that maintenance mode has been released (with information area of MMB Web-UI not gray out) and click [Next].



Post-processing of software using a PCI Express card

After replacing a PCI Express card, restart the software stopped before the PCI Express card replacement or make the software operation applicable again, as needed.

4.6.3 FC card (Fibre Channel card) replacement procedure

The descriptions in this section assume that an FC card is being replaced.

Notes

- The FC card used for SAN boot does not support hot plugging.
- Although you can hot replace FC card used for dump device of sadump, collecting dump of memory fails until reconfiguring HBA UEFI or extended BIOS with the partition inactive after replacing the FC card.
- This section does not cover configuration changes in peripherals (e.g., UNIT addition or removal for a SAN disk device).
- This manual does not describe how to change the configuration of peripherals such as expanding and removing the unit of SAN disk device.

- To prevent a device name mismatch due to the failure, addition, removal, or replacement of an FC card, access the SAN disk unit by using the by-id name (/dev/disk/by-id/...) for the device name.
- If all the paths in a mounted disk become hidden when an FC card is hot replaced, unmount the disk. Then, execute PCI hot plug.

FC card replacement procedure

The procedure for replacing only a faulty FC card without replacing other peripherals is as follows.

1. Make the necessary preparations.
   Stop access to the faulty FC card, such as by stopping applications.
2. Confirm the slot number of the PCI Express slot.
   See 'Confirming the slot number of a PCI Express slot' in "4.6.2 PCI Express card replacement procedure in detail".
3. Power off the PCI Express slot.
   See 'Powering on and off PCI Express slots' in "4.6.2 PCI Express card replacement procedure in detail".
4. Physically replace the target card by using MMB Maintenance Wizard. This step is performed by the field engineer in charge of your system.
   For details on the operation of replacement, see step 1 to 7 of 'Operation for Hot replacement of PCI Express card by Maintenance Wizard' in "4.6.2 PCI Express card replacement procedure in detail".
5. Reconfigure the peripheral according to its manual.
   For example, suppose that the storage device used is ETERNUS and that the host affinity function is used (to set the access right for each server). Their settings would need to be changed as a result of FC card replacement.
6. Connect the FC card cable.
7. Power on the PCI Express slot.
   See 'Powering on and off PCI Express slots' in "4.6.2 PCI Express card replacement procedure in detail".
8. Check whether there is an error in added FC card by MMB Maintenance Wizard.
   This step is performed by the field engineer in charge of your system.
   For details on the operation of replacement, see step 8 to 11 of 'Operation for Hot replacement of PCI Express card by Maintenance Wizard' in "4.6.2 PCI Express card replacement procedure in detail".
9. Check the version of the firmware
   It is required that the firmware version of new FC card is same as that of the FC card which had been replaced. If the firmware version of new FC card is coincident with that of the FC card which had been replaced (current firmware version), it is not necessary to update the firmware version of new FC card to current firmware version.
   If the firmware version of new FC card is not coincident with that of the FC card which had been replaced (current firmware version), update the firmware version of new FC card to current firmware version.
   For how to update the firmware version, see Firmware update manual for fibre channel card.
   Note
   If you cannot confirm the firmware version of the FC card before replacing due to the fault of the FC card, check the firmware version of the FC card which is same type as the faulty one to update firmware version.
10. Confirm the incorporation results.
    'Confirming the FC card incorporation results' describes the confirmation method. Start operation with the FC card again by restarting applications as needed or by other such means.
11. Perform the necessary post-processing.
    If you stopped any other application in step 1, restart it too as needed.

Confirming the FC card incorporation results

Confirm the incorporation results of the FC card and the corresponding driver in the following method. Then, take appropriate action. Check the log. (The following example shows a log of FC card hot plugging.)
As shown below, the output of an FC card incorporation message and device found message as the log output to /var/log/messages after the PCI Express slot containing the mounted FC card is enabled means that the FC card was successfully incorporated.

```
scsi10:Emulex LPe1250-F8 8Gb PCIe Fibre Channel ¥
       Adapter on PCI bus 0f device 08 irq 59 ...(*1)
       lpfc 0000:0d:00.0: 0:1303 Link Up Event x1 received ¥
       Data: x1 x0 x10 x0 x0 x0 0 ...(*2)
```

```
       scsi 2:0:0:0: Direct-Access FUJITSU E4000 ¥
0000 PQ: 1 ANSI: 5        ...(*3)
```

The ¥ at the end of a line indicates that there is no line feed.

If only the message in (*1) is displayed but the next line is not displayed or if the message in (*1) is not displayed, the FC card replacement itself was unsuccessful. (See Note below.) In this case, power off the slot once. Then, check the following points again:

- Whether the FC card is correctly inserted into the PCI Express slot
- Whether the latch is correctly set

Eliminate the problem, power on the slot again, and check the log.
If the message in (*1) is displayed but the FC linkup message in (*2) is not displayed, the FC cable may be disconnected or the FC path may not be set correctly. Power off the slot once. Confirm the following points again.

- Confirm the FC driver setting.
  The definition file containing a description of the driver option of the FC driver (lpfc) is identified with the following command.
  Example: Description in /etc/modprobe.d/lpfc.conf

  ```
  # grep -l lpfc /etc/modprobe.d/*

  /etc/modprobe.d/lpfc.conf
  ```

  Confirm that the driver option of the FC driver (lpfc) is correctly set. For details, contact the distributor where you purchased your product, or your sales representative.
- Check the FC cable connection status.
- Confirm the Storage FC settings.
  Confirm that the settings that conform to the actual connection format (Fabric connection or Arbitrated Loop connection) were made.
  If the messages in (*1) and (*2) are displayed but the messages in (*3) are not displayed, the storage is not yet found. Check the following points again. These are not card problems, so you need not power off the slot for work.
  - Review FC-Switch zoning settings.
  - Review storage zoning settings.
  - Review storage LUN Mapping settings.

    Also, confirm that the storage can be correctly viewed from LUN0.
    Eliminate the problem. Then, confirm the settings and recognize the system by using the following procedure.

1. Confirm the host number of the incorporated FC card from the message at (*1).
   xx in scsixx (xx is a numerical value) in the message at (*1) is a host number. In the above example, the host number is 10.
2. Scan the device by executing the following command.

   ```
   # echo "-" "-" "-" > /sys/class/scsi_host/hostxx/scan
   (# is command prompt)

   (xx in hostxx is the host number entered in step 1.)
   ```

   The command for the above example is as follows.

   ```
   # echo "-" "-" "-" > /sys/class/scsi_host/host10/scan
   ```

3. Confirm that a message like (*3) was output to /var/log/messages.
   If this message is not displayed, confirm the settings again.

   Note
   In specific releases of RHEL, a message like (*1) for confirming FC card incorporation may be output in the following format with card name information omitted.

   ```
   scsi10 : on PCI bus 0f device 08 irq 59
   ```

In this case, check for the relevant message on the FC card incorporation by using the following procedure.

a. Confirm the host number.
xx in scsixx (xx is a numerical value) in the message is a host number. In the above example, the host number is 10.

b. Check whether the following file exists by using the host number.

```
/sys/class/scsi_host/hostxx/modeldesc
(xx in hostxx is the host number entered in step 1.)
```

If the file does not exist, the judgment is that no such message was output from the FC card.

c. If the file exists, check the file contents by using the following operation.

```
# cat /sys/class/scsi_host/hostxx/modeldesc
Emulex LPe1250-F8 8Gb PCIe Fibre Channel Adapter

(xx in hostxx is the host number entered in step 1.)
```

If the output is like the above, the judgment is that the relevant message was output by the incorporation of the FC card.

4.6.4 Network card replacement procedure

Network card (referred to below as NIC) replacement using hot plugging needs specific processing before and after PCI Express slot power-on or power-off. Its procedure also includes to the common PCI Express card replacement procedure.
The procedure describes operations where a single NIC is configured as one interface. It also describes cases where multiple NICs are bonded together to configure one interface (bonding configuration). For bonding multiple NIC by using PRIMECLUSTER Global Link Services (GLS), see 'PRIMECLUSTER Global Link Service Configuration and Administration Guide Redundant Line Control Function for Linux' (J2UZ-7781).

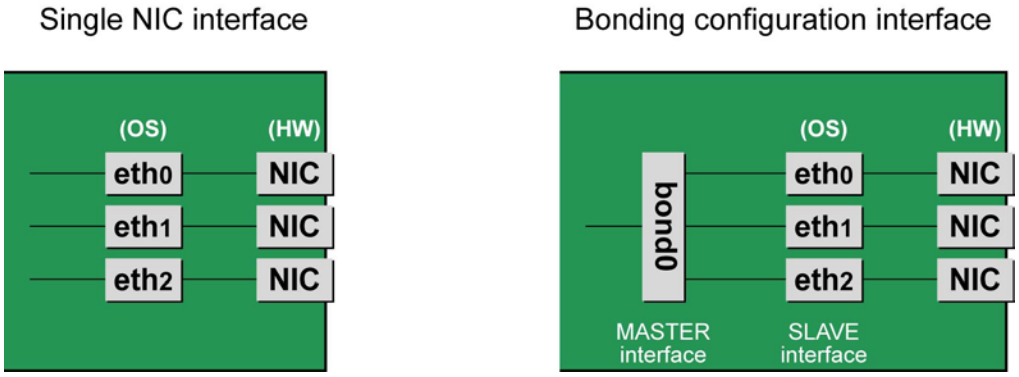


FIGURE 4.2 Single NIC interface and bonding configuration interface

NIC replacement procedure

This section describes the procedure for NIC replacement.
Notes

- When replacing multiple NICs, be sure to replace them one by one. If you replace multiple cards at the same time, they may not be correctly configured.
- To perform hot replacement in a system where a bonding device is installed, design the system so that it specifies ONBOOT=YES in all interface configuration files (the /etc/sysconfig/network-scripts/ifcfg-eth*files and the /etc/sysconfig/network-scripts/ifcfg-bond*files), regardless of whether the NIC to be replaced is a configuration interface of the bonding device.

An IP address does not need to be assigned to unused interfaces. This procedure is for preventing the device name of the replacement target NIC from being changed after hot replacement. If ONBOOT=NO also exists, the procedure described here may not work properly.

1. Confirm the slot number of the PCI Express slot that has the mounted interface.
Confirm the interface mounting location through the configuration file information and the operating

system information. First, confirm the bus address of the PCI Express slot that has the mounted interface to be replaced.
Example: eth0 interface

```
# ls -l /sys/class/net/eth0/device
lrwxrwxrwx 1 root root 0 Sep 29 10:17 ¥
/sys/class/net/eth0/device
->../../../0000:00:01.2/0000:08:00.2/0000:0b:01.0
```

The ¥ at the end of a line indicates that there is no line feed.

Excluding the rest of the directory path, check the part corresponding to the file name in the symbolic link destination file of the output results. In the above example, the underlined part shows the bus address. ("0000:0b:01" in the example)

Note
You will use the bus address obtained here in steps 2 and 11. Record the bus address so that you can reference it later.

Next, check the PCI Express slot number for this bus address.

```
# grep -il 0000:0b:01 /sys/bus/pci/slots/*/address
/sys/bus/pci/slots/20/address
```

Read the output file path as shown below, and confirm the PCI Express slot number.

```
/sys/bus/pci/slots/<slot number>/address
```

Notes
If the above file path is not output, it indicates that the NIC is not mounted in a PCI Express slot (e.g., GbE port in the IOU).
With the PCI Express slot number confirmed here, see 'D.2 Correspondence between PCI Slot Mounting Locations and Slot Numbers'PCI Express slot to check the mounting location, and see also 'B.1 Physical Mounting Locations of Components' to identify the physical mounting location corresponding to the PCI Express slot number. You can confirm that it matches the mounting location of the operational target NIC.

2. Collect information about interfaces on the same NIC.
For a NIC that has more than one interface, you will need to deactivate all the interfaces on the NIC. Use the following procedure to check each interface that has the same bus address as that confirmed in step 1. Then, make a table with information including the interface name, hardware address, and bus address.
Note
Collect the following information even if the NIC has only one interface.

- Confirm the correspondence between the bus address and interface name.
Execute the following command, and confirm the correspondence between the bus address and interface name.
Example: The bus address is "0000:0b:01".

```
# ls -l /sys/class/net/*/device | grep "0000:0b:01"
lrwxrwxrwx 1 root root 0 Sep 29 10:17 ¥
/sys/class/net/eth0/device
->../../../0000:00:01.2/0000:08:00.2/0000:0b:01.0
lrwxrwxrwx 1 root root 0 Sep 29 10:17 ¥
/sys/class/net/eth1/device
->../../../0000:00:01.2/0000:08:00.2/0000:0b:01.1
```

The ¥ at the end of a line indicates that there is no line feed.

The following table shows the correspondence between the bus addresses and interface names from the above output example.

TABLE 4.6 Correspondence between bus addresses and interface names

Interface name	Hardware address	Bus address	Slot number
eth0		0000:0b:01.0	20
eth1		0000:0b:01.1	20
...		...	...

Note
When recording a bus address, include the function number (number after the period).

- Confirm the correspondence between the interface name and hardware address.
Execute the following command, and confirm the correspondence between the interface name and

hardware address.
Example: eth0 [For a single interface]

```
# cat /sys/class/net/eth0/address
00:0e:0c:70:c3:38
```

Example: eth0 [For a bonding interface]
The bonding driver rewrites the values for the slave interface of the bonding device. Confirm the hardware address by executing the following command.

```
# cat /proc/net/bonding/bondY

Ethernet Channel Bonding Driver .........
.
.
Slave interface: eth0
.
Permanent HW addr: 00:0e:0c:70:c3:38
.
.
```

You can use this procedure only when the bonding device is active. If the bonding device is not active or the slave has not been incorporated, use the same procedure as for a single interface.

Also, the correspondence between the interface name and hardware address is automatically registered by the system in the udev function rule file, /etc/udev/rules.d/70-persistent-net.rules. Confirm that the ATTR{address} and NAME items have the same definitions as in the above output.
Example: eth0

```
grep eth0 /etc/udev/rules.d/70-persistent-net.rules

SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ¥
ATTR{address}=="00:0e:0c:70:c3:38", ATTR{type}=="1", ¥
KERNEL=="eth*", NAME="eth0"
```

The ¥ at the end of a line indicates that there is no line feed.

You can always obtain the correct hardware address from the description in etc/udev/rules.d/70-persistent-net.rules regardless of whether the interface is incorporated in bonding.
Confirm the hardware address of other interfaces by repeating the operation with the same command. The following table lists examples of descriptions.

TABLE 4.7 Hardware address description examples

Interface name	Hardware address	Bus address	Slot number
eth0	00:0e:0c:70:c3:38	0000:0b:01.0	20
eth1	00:0e:0c:70:c3:39	0000:0b:01.1	20
...	...	...	...

The above step is used in creating the correspondence table in step 13. Prepare a table here so that you can reference it later.
Note
In a replacement due to a device failure, the information in the table showing the correspondence between the interface and the hardware address, bus address, and slot number may be inaccessible depending on the failure condition. We strongly recommend that a table showing the correspondence between the interface and the hardware address, bus address, and slot number be created for all interfaces at system installation.

3. Execute the higher-level application processing required before NIC replacement.
   Stop all access to the interface as follows. Stop the application that was confirmed in step 2 as using the interface, or exclude the interface from the target of use by the application.

4. Deactivate the NIC.
   Execute the following command to deactivate all the interfaces that you confirmed in step 2.
   The applicable command depends on whether the target interface is a single NIC interface or the SLAVE interface of a bonding device.
   [For a single NIC interface]

```
# /sbin/ifdown ethX
```

If the single NIC interface has a VLAN device, you also need to remove the VLAN interface. Perform the following operations (before deactivating the real interface).

```
# /sbin/ifdown ethX.Y
# /sbin/vconfig rem ethX.Y
```

[For the SLAVE interface of a bonding device]
If the bonding device is operating in mode 1, use the following steps for safety purposes on the SLAVE interface to be replaced to exclude it from operation. In any other mode, removing it immediately should not cause any problems.
Confirm that the SLAVE interface to be replaced is the interface currently being used for communication. First, confirm the interface currently being used for communication by executing the following command.

```
# cat /sys/class/net/bondY/bonding/active_slave
```

If the displayed interface matches the SLAVE interface being replaced, execute the following command to switch the current communication interface to another SLAVE interface.

```
# /sbin/ifenslave -c bondY ethZ
(ethZ: Interface that composes bondY and does not perform
hot replacement)
```

Finally, remove the SLAVE interface being replaced, from the bonding configuration. Immediately after being removed, the interface is automatically no longer used.

```
# /sbin/ifenslave -d bondY ethX
```

5. Power off the PCI Express slot.

   - For the partition with Dynamic Reconfiguration utility installed
     Execute /opt/FJSVdp-util/sbin/dp rm pcie<slot number> command on the shell of OS.
     The PCI Express card is disabled and has become to be ready for removal. The LED goes out.
     Example: Making the PCI Express slot with PCI Express slot number 20 power off

     ```
     # /opt/FJSVdp-util/sbin/dp rm pcie20
     ```

     This operation concurrently removes the device associated with the relevant adapter from the system.

   - For the partition without Dynamic Reconfiguration utility installed
     Confirm that the /sys/bus/pci/slots directory contains a directory for the target slot information, which will be referenced and otherwise used. Below, the slot number confirmed in step 1 is shown at <slot number> in the directory path in the following format, where the directory is the operational target.

     ```
     /sys/bus/pci/slots/<slot number>
     ```

     To disable a PCI Express card and make it ready for removal, write "0" to the "power" file in the directory corresponding to the target slot. The LED goes out. The interface (ethX) is removed at the same time.

     ```
     # echo 0 > /sys/bus/pci/slots/<slot number>/power
     ```

6. Save the interface configuration file.
   Save all the interface configuration files that you checked in step 2 by executing the following command. udevd and configuration scripts may reference the contents of files in /etc/sysconfig/network-scripts. For this reason, create a save directory and save these files to the directory so that udevd and the configuration scripts will not reference them.

   ```
   # cd /etc/sysconfig/network-scripts
   # mkdir temp
   # mv ifcfg-ethX temp
   (following also executed for bonding configuration)
   # mv ifcfg-bondX temp
   ```

7. Physically replace the NIC by using MMB Maintenance Wizard. This step is performed by the field engineer in charge of your system.
   For details on the operation of replacement, see step 1 to 7 of ‘Operation for Hot replacement of PCI Express card by Maintenance Wizard’ in “4.6.2 PCI Express card replacement procedure in detail”.

8. Delete the entries associated with the replaced NIC from the udev function rule file.
   Each entry for the new NIC is automatically added to the udev function rule file, /etc/udev/rules.d/70-persistent-net.rules, when the NIC is detected. However, the entries of a NIC are not automatically

deleted even if the NIC is removed. Leaving the entries of the removed NIC may have the following impact.

- The interface names defined in the entries of the removed NIC cannot be assigned to the replacement NIC or an added NIC.

For this reason, delete or comment out the entries of the removed NIC from the udev function rule file.

a Confirm the correspondence between the interface name and hardware address in the table created in step 2.

b Edit the udev function rule file, /etc/udev/rules.d/70-persistent-net.rules, to delete or comment out the entry lines of all the interface names and hardware addresses confirmed in the above step 1.

The following example shows editing of the udev function rule file.
[Example of descriptions in the file before editing]

```
# PCI device 0x****:0x**** (e1000)
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ¥
ATTR{address}=="00:0e:0c:70:c3:38", ATTR{type}=="1", ¥
KERNEL=="eth*", NAME="eth0"
# PCI device 0x****:0x**** (e1000)
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ¥
ATTR{address}=="00:0e:0c:70:c3:39", ATTR{type}=="1", ¥
KERNEL=="eth*", NAME="eth1"
  :
  :
```

The ¥ at the end of a line indicates that there is no line feed.

[Example of descriptions in the file after editing]
(In the example, eth0 was deleted, and eth1 is commented out.)

```
# PCI device 0x****:0x**** (e1000)
# SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ¥
ATTR{address}=="00:0e:0c:70:c3:39", ATTR{type}=="1", ¥
KERNEL=="eth*", NAME="eth1"
  :
  :
```

The ¥ at the end of a line indicates that there is no line feed.

Do this editing for all the interfaces listed in the table created in step 2.

9. Reflect the edited rules in udev.
udevd reads the rules described in the rule file at its start time and then retains the rules in memory. Simply changing the rule file does not mean the changed rules are reflected. Take action as follows to reflect the new rules in udev.

```
# udevadm control --reload-rules
```

10. Power on the PCI Express slot.
See 'Powering on and off PCI Express slots' in "4.6.2 PCI Express card replacement procedure in detail".

11. Check whether there is an error in added FC card by MMB Maintenance Wizard.
This step is performed by the field engineer in charge of your system.
For details on the operation of replacement, see step 8 to 11 of 'Operation for Hot replacement of PCI Express card by Maintenance Wizard' in "4.6.2 PCI Express card replacement procedure in detail".

12. Collect the information associated with an interface on the replacement NIC.
An interface (ethX) is created for the replacement NIC at the power-on time. Make a table with information about each interface created for the replacement NIC. Such information includes the interface name, hardware address, and bus address. Use the bus address confirmed in step 1 and the same procedure as in step 2.

TABLE 4.8 Example of interface information about the replacement NIC

Interface name	Hardware address	Bus address	Slot number
eth1	00:0e:0c:70:c3:40	0000:0b:01.0	20
eth0	00:0e:0c:70:c3:41	0000:0b:01.1	20
...	...	...	...

Confirm that a new hardware address is defined for the bus address. Also confirm that the assigned interface name is the same as that before the NIC replacement.

Also confirm that the relevant entries in the above-described table were automatically added to the udev function rule file, /etc/udev/rules.d/70-persistent-net.rules.
Note
The correspondence between the bus address and interface name may be different from that before NIC replacement. In such cases, just proceed with the work. This is explained in step 13.

13. Deactivate each newly created interface.
The interfaces created for the replacement NIC may be active because power is on to the PCI Express slot. In such cases, you need to deactivate them before changing the interface configuration file.
Execute the following command for all the interface names confirmed in step 11.
Example: eth0

```
# /sbin/ifconfig eth0 down
```

14. Confirm the correspondence between the interface names before and after the NIC replacement.
From the interface information created before and after the NIC replacement in steps 2 and 11, confirm the correspondence between the interface names before replacement and the new interface names.

    a Confirm the correspondence between the bus address and interface name on each line in the table created in step 2.

    b Likewise, confirm the correspondence between the bus addresses and interface names in the table created in step 11.

    c Match the interface names to the same bus addresses before and after the NIC replacement.

    d In the table created in step 11, enter values corresponding to the interface names before and after the NIC replacement.

TABLE 4.9 Example of entered values corresponding to the interface names before and after NIC replacement

Interface name After replacement (-> Before replacement)	Hardware address	Bus address	Slot number
eth1 (-> eth0)	00:0e:0c:70:c3:40	0000:0b:01.0	20
eth0 (-> eth1)	00:0e:0c:70:c3:41	0000:0b:01.1	20
...	...	...	...

15. If an interface name is switched before and after the NIC replacement, make the interface name correspond to the same bus address as before the NIC replacement by using the following procedure.
Note
Confirm that the interface name is the same before and after the NIC replacement. Then, proceed to step 15.

    a Power off the PCI Express slot again.
    Repeat the process done in step 5 to power off the PCI Express slot.

    b Correct the interface name that is not the same before and after the NIC replacement in the entries of the udev function rule file, /etc/udev/rules.d/70-persistent-net.rules. Make the interface name the same as before the NIC replacement.
    [Example of descriptions in the file before editing]

```
# PCI device 0x****:0x**** (e1000)
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ¥
ATTR{address}=="00:0e:0c:70:c3:40", ATTR{type}=="1", ¥
KERNEL=="eth*", NAME="eth1"
# PCI device 0x****:0x**** (e1000)
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ¥
ATTR{address}=="00:0e:0c:70:c3:41", ATTR{type}=="1", ¥
KERNEL=="eth*", NAME="eth0"
 :
 :
```

    The ¥ at the end of a line indicates that there is no line feed.

    [Example of descriptions in the file after editing]
    (eth1, the name after replacement, has been corrected to eth0, the name before replacement.)

```
# PCI device 0x****:0x**** (e1000)
```

```
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ¥
ATTR{address}=="00:0e:0c:70:c3:40", ATTR{type}=="1", ¥
KERNEL=="eth*", NAME="eth0"
# PCI device 0x****:0x**** (e1000)

SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ¥
ATTR{address}=="00:0e:0c:70:c3:41", ATTR{type}=="1", ¥
KERNEL=="eth*", NAME="eth1"
  :
  :
```

The ¥ at the end of a line indicates that there is no line feed.

c Reflect the edited rules again.
Repeat the process done in step 9 to reflect the rules.

```
# udevadm control --reload-rules
```

d Power on the PCI Express slot.
Repeat the process done in step 10 to power on the PCI Express slot.
The interfaces created for the replacement NIC may be active because power is on to the PCI Express slot. At this stage, since we recommend proceeding with the work with the interface on the replaced NIC deactivated, repeat the operation in step 12.

e Collect the information about interfaces on the NIC again, and create a table.
Use the same procedure as in step 2 to update the interface name information in the table from step 13 showing the correspondence of the interface before and after NIC replacement.
Note
Confirm that each specified interface name is the same as before the NIC replacement.

Table4.10 Confirmation of interface names

Interface name	Hardware address	Bus address	Slot number
eth0	00:0e:0c:70:c3:40	0000:0b:01.0	20
eth1	00:0e:0c:70:c3:41	0000:0b:01.1	20
...	...	...	...

16. Edit the saved interface configuration file.
Write a new hardware address to replace the old one. In "HWADDR," set the hardware address of the replacement NIC in ‘TABLE 4.9 Example of entered values corresponding to the interface names before and after NIC replacement’’ or ‘TABLE 4.5 Hardware address description examples’. Also, for SLAVE under bonding, the file contents are partly different, but the lines to be set are the same.

```
(Example)
DEVICE=eth0
NM_CONTROLLED=no BOOTPROTO=static HWADDR=00:0E:0C:70:C3:40
BROADCAST=192.168.16.255
IPADDR=192.168.16.1
NETMASK=255.255.255.0
NETWORK=192.168.16.0
ONBOOT=yes
TYPE=Ethernet
```

Do this editing for all the saved interfaces.

17. Restore the saved interface configuration file to the original file.
Restore the interface configuration file saved to the save directory to the original file by executing the following command.

```
# cd /etc/sysconfig/network-scripts/temp
# mv ifcfg-ethX   ..
(following also executed for bonding configuration)
# mv ifcfg-bondX   ..
```

18. Activate the replaced interface.
The method for activating a single NIC interface differs from that for activating the SLAVE interfaces under bonding.
[For a single NIC interface]
Execute the following command to activate the interface. Activate all the necessary interfaces.

```
# /sbin/ifup ethX
```

Also, if the single NIC interface has a VLAN device and the VLAN interface was temporarily removed, restore the VLAN interface. If the priority option has changed, set it again.

```
# /sbin/vconfig add ethX Y
# /sbin/ifup ethX.Y
(enter command to set VLAN option as needed)
```

[For SLAVE under bonding]
Execute the following command to incorporate the SLAVE interface into the existing bonding configuration. Incorporate all the necessary interfaces.

```
# /sbin/ifenslave bondY ethX
```

The VLAN-related operation is normally not required because a VLAN is created on the bonding device.

19. Remove the directory to which the interface configuration file was saved.
    After all the interfaces to be replaced have been replaced, remove the save directory created in step 6 by executing the following command.

```
# rmdir /etc/sysconfig/network-scripts/temp
```

20. Execute the higher-level application processing required after NIC replacement.
    Perform the necessary post processing (such as starting an application or restoring changed settings) for the operations performed for the higher-level applications in step 3.

4.6.5 Hot replacement procedure for iSCSI (NIC)

When performing hot replacement of NICs used for iSCSI connection, use the following procedures.

- 4.6.1 Overview of common replacement procedures for PCI Express cards
- 4.6.2 PCI Express card replacement procedure in detail
- 4.6.4 Network card replacement procedure

A supplementary explanation of the procedure follows.

Prerequisites for iSCSI (NIC) hot replacement

- The prerequisites for iSCSI (NIC) hot replacement are as follows.
- The storage connection is established on a multipath using DM-MP (Device-Mapper Multipath) or ETERNUS multidriver (EMPD).
- To replace more than one iSCSI card, one card at a time will be replaced.
- A single NIC is configured as one interface.

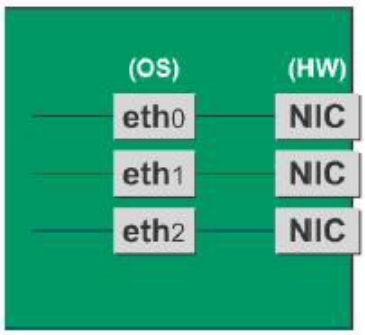


FIGURE 4.3 Example of single NIC interface

Work to be performed before iSCSI (NIC) replacement

For iSCSI (NIC) hot replacement, be sure to follow the procedure below when performing Step 3 of the 'NIC replacement procedure' in '4.6.4 Network card replacement procedure'

1. Perform the work for suppressing access to the iSCSI connection interface.
   a Confirm the state of multiple path by DM-MP (*1) or EMPD (*2).

b Use the iscsiadm command to log out from the path (iqn) through which the iSCSI card to be replaced is routed, and disconnect the session.
Example which confirms the state of session before disconnecting:

```
# /sbin/iscsiadm -m session
tcp: [1] 192.168.1.64:3260,1 iqn.2000-
09.com.fujitsu:storage-system.eternus-
dx400:00001049.cm0ca0p0
tcp: [2] 192.168.2.66:3260,3 iqn.2000-
09.com.fujitsu:storage-system.eternus-
dx400:00001049.cm1ca0p0
```

Example which logout path going through a NIC to be replaced:

```
# /sbin/iscsiadm -m node -T iqn.2000-09.com.fujitsu:storage-
system.eternus-dx400:00001049.cm1ca0p0 -p 192.168.2.66:3260
–logout
```

c Use the iscsiadm command to confirm that the target session has been disconnected.
Example which confirms the state of session after disconnecting

```
# /sbin/iscsiadm -m session
tcp: [1] 192.168.1.64:3260,1 iqn.2000-
09.com.fujitsu:storage-system.eternus-
dx400:00001049.cm0ca0p0
```

d You can confirm the disconnection of sessions on multipath products using DM-MP or ETERNUS multidriver.
*1: Write down the DM-MP display contents at the session disconnection.
Example of DM-MP display before disconnecting path

```
# /sbin/multipath -ll
mpath1 (36000b5d0006a0000006a104900000000) dm-0
FUJITSU,ETERNUS_DX400
[size=50G][features=0][hwhandler=0][rw]
¥_ round-robin 0 [prio=2][active]
 ¥_ 3:0:0:0 sdb 8:16  [active][ready]
 ¥_ 4:0:0:0 sdc 8:32  [active][ready]
```

Example of DM-MP display after disconnecting path

```
# /sbin/multipath -ll
mpath1 (36000b5d0006a0000006a104900000000) dm-0
FUJITSU,ETERNUS_DX400
[size=50G][features=0][hwhandler=0][rw]
¥_ round-robin 0 [prio=1][enabled]
 ¥_ 3:0:0:0 sdb 8:16  [active][ready]
```

*2: See the ETERNUS Multipath Driver User's Guide (For Linux).

Work to be performed after NIC replacement

For iSCSI (NIC) hot replacement, be sure to follow the procedure below when Step 19 of the NIC replacement procedure in 4.6.4 Network card replacement procedure.

2. To restore access to the iSCSI connection interface, perform the following.

e Confirm the state of multiple path by DM-MP (*1) or EMPD (*2).

f Use the iscsiadm command to log in to the path (iqn) through which the replacement iSCSI card is routed, and reconnect the session.
Example which confirms the state of session before connecting:

```
# /sbin/iscsiadm -m session
tcp: [1] 192.168.1.64:3260,1 iqn.2000-
09.com.fujitsu:storage-system.eternus-
dx400:00001049.cm0ca0p0
```

Example which login path going through a NIC to be replaced:

```
# /sbin/iscsiadm -m node -T iqn.2000-09.com.fujitsu:storage-
system.eternus-dx400:00001049.cm1ca0p0 -p 192.168.2.66:3260
–login
```

g Use the iscsiadm command to confirm that the target session has been activated.
Example which confirms the state of session after connecting

```
# /sbin/iscsiadm -m session
tcp: [1] 192.168.1.64:3260,1 iqn.2000-
09.com.fujitsu:storage-system.eternus-
dx400:00001049.cm0ca0p0
tcp: [3] 192.168.2.66:3260,3 iqn.2000-
09.com.fujitsu:storage-system.eternus-
dx400:00001049.cm1ca0p0
```

h You can confirm the activation of sessions on multipath products using DM-MP or ETERNUS multidriver.
*1: Write down the DM-MP display contents at the session activation.
Example of DM-MP display before connecting path

```
# /sbin/multipath -ll
mpath1 (36000b5d0006a0000006a104900000000) dm-0
FUJITSU,ETERNUS_DX400
[size=50G][features=0][hwhandler=0][rw]
¥_ round-robin 0 [prio=1][active]
 ¥_ 3:0:0:0 sdb 8:16  [active][ready]
```

Example of DM-MP display after connecting path

```
# /sbin/multipath -ll
mpath1 (36000b5d0006a0000006a104900000000) dm-0
FUJITSU,ETERNUS_DX400
[size=50G][features=0][hwhandler=0][rw]
¥_ round-robin 0 [prio=2][enabled]
 ¥_ 3:0:0:0 sdb 8:16  [active][ready]
 ¥_ 5:0:0:0 sdc 8:32  [active][ready]
```

*2: See the ETERNUS Multipath Driver User's Guide (For Linux).

4.7 Hot Addition of PCI Express cards

This section describes the PCI Express card addition procedure with the PCI Hot Plug function.
The procedure includes common steps for all PCI Express cards and the additional steps required for a specific card function or driver.
Thus, the descriptions cover both the common operations required for all cards (e.g., power supply operations) and the specific procedures required for certain types of card. For details on addition of the cards not described in this section, see the respective product manuals.
There are two ways to perform PCI hot plug:

- Operation by using sysfs
- Operation by using dp commands

You can perform the operation by using dp commands if Dynamic Reconfiguration utility is installed in the partition. If not, be sure to use the operation by using sysfs. Although you can perform the operation by using sysfs even if Dynamic Reconfiguration utility is installed in the partition, it is recommended to perform the operation by using dp commands to prevent wrong operation.
Hereafter, description about the operation by using dp commands starts at ‘For the partition with Dynamic Reconfiguration utility installed’ and description about the operation by sysfs starts at ‘For the partition without Dynamic Reconfiguration utility installed’.
Notes
If you hot add PCI Express cards into an IOU, see ‘4.4 Hot add of IOU’.

4.7.1 Common addition procedures for all PCI Express cards

1. Performing the required operating system and software operations depending on the PCI card type
2. Confirming that the PCI Express slot power is off
3. Adding a PCI card
   This step is performed by the field engineer in charge of your system.

4. Powering on a PCI Express slot.
5. Performing the required operating system and software operations depending on the PCI card type

Notes
This section describes instructions for the operating system and subsystems (e.g., commands, configuration file editing). Be sure to refer to the respective product manuals to confirm the command syntax and impact on the system before performing tasks with those instructions.
The following sections describe card addition with the required instructions (e.g., commands, configuration file editing) for the operating system and subsystems, together with the actual hardware operations. Step 3 is performed by the field engineer in charge of your system.

4.7.2 PCI Express card addition procedure in detail

This section describes operations that must be performed in the PCI Express card addition procedure.

Confirming the slot number of a PCI Express slot

See 'Confirming the slot number of a PCI Express slot' in "4.6.2 PCI Express card replacement procedure in detail".

Checking the power status of a PCI Express slot

See 'Checking the power status of a PCI Express slot' in "4.6.2 PCI Express card replacement procedure in detail".

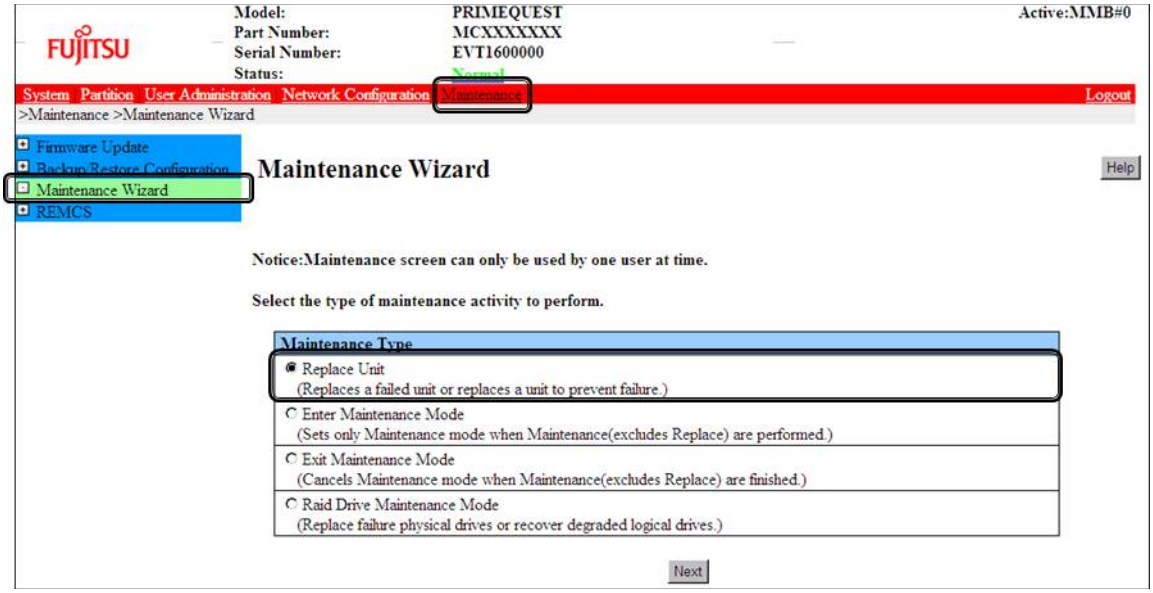
Powering on and off PCI Express slots

See 'Powering on and off PCI Express slots' in "4.6.2 PCI Express card replacement procedure in detail".

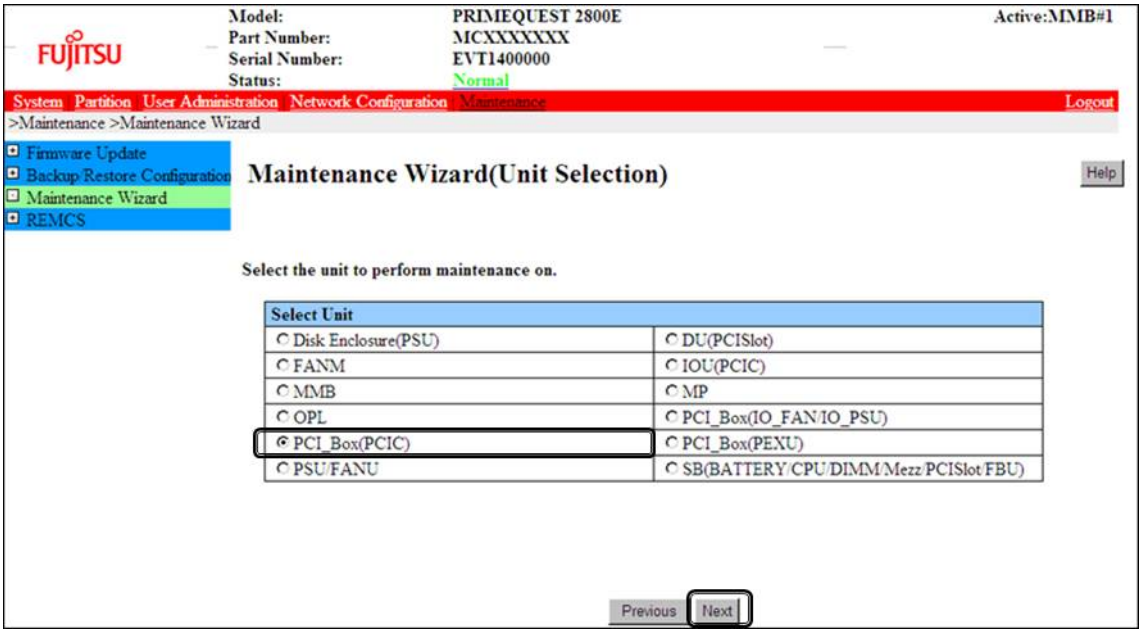
Operation for Hot add of PCI Express card by Maintenance Wizard

This item describes Operation for Hot add of PCI Express card (PCIC) by Maintenance Wizard.
Below works are performed by the field engineer in charge of your system.

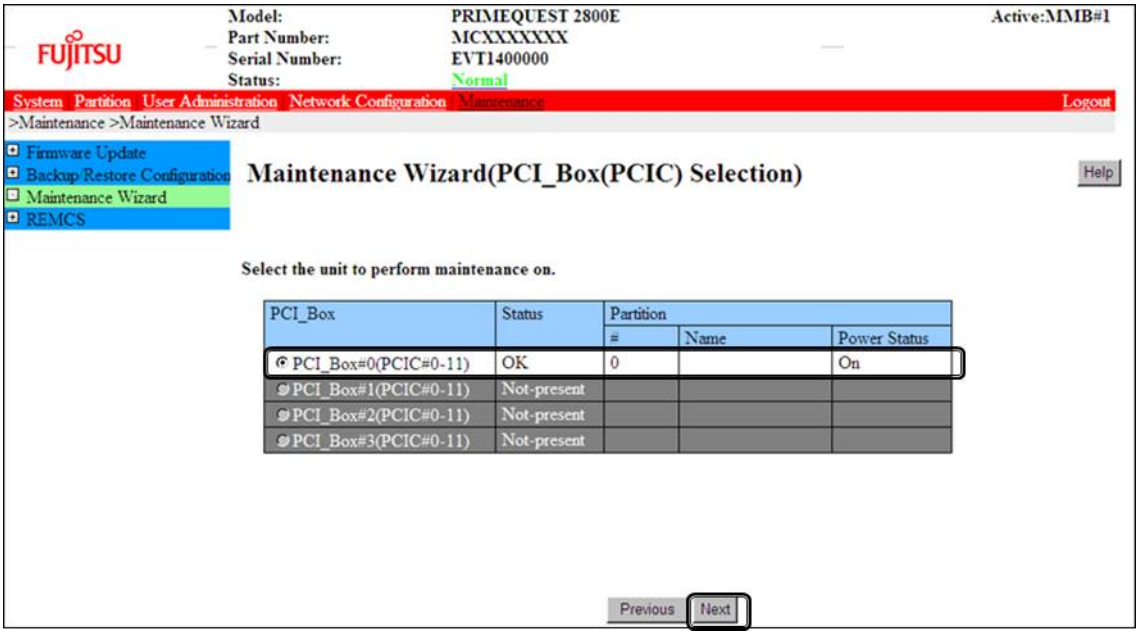
1. Start [Maintenance Wizard] menu by MMB Web-UI and display [Maintenance Wizard] view.
2. Select [Replace Unit] and click [Next].


Model: PRIMEQUEST
Part Number: MCXXXXXXX
Serial Number: EVT1600000
Status: Normal
Active:MMB#0
FUJITSU
System Partition User Administration Network Configuration Maintenance Logout
>Maintenance >Maintenance Wizard
Firmware Update
Backup/Restore Configuration
Maintenance Wizard
REMCS
Maintenance Wizard
Help
Notice:Maintenance screen can only be used by one user at time.
Select the type of maintenance activity to perform.
Maintenance Type
Replace Unit
(Replaces a failed unit or replaces a unit to prevent failure.)
Enter Maintenance Mode
(Sets only Maintenance mode when Maintenance(excludes Replace) are performed.)
Exit Maintenance Mode
(Cancels Maintenance mode when Maintenance(excludes Replace) are finished.)
Raid Drive Maintenance Mode
(Replace failure physical drives or recover degraded logical drives.)
Next

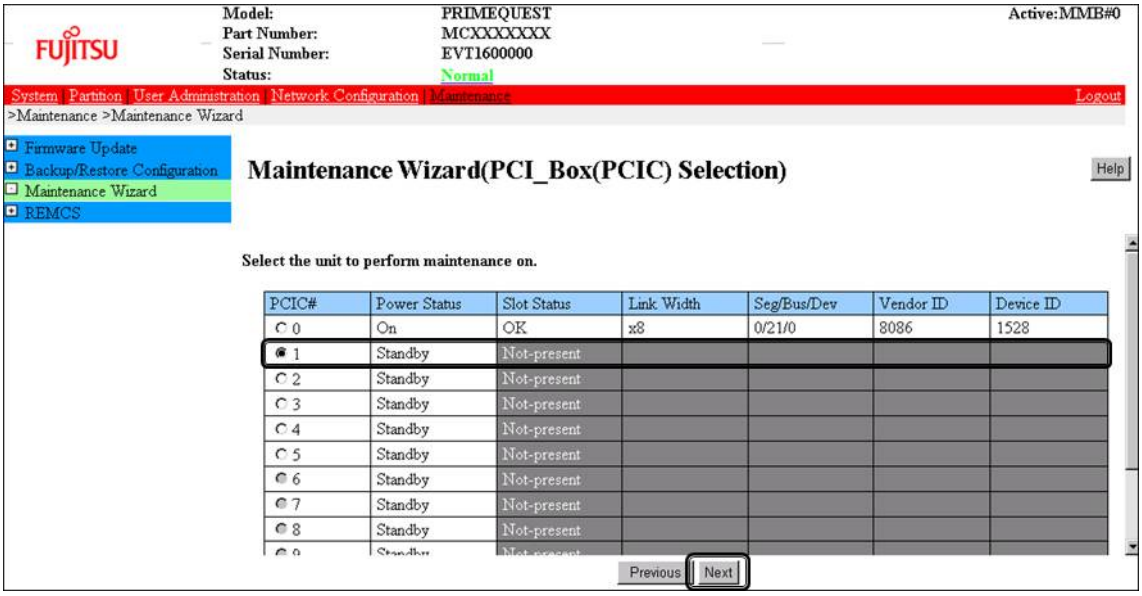
3. Select [PCI_Box(PCIC)], click [Next].



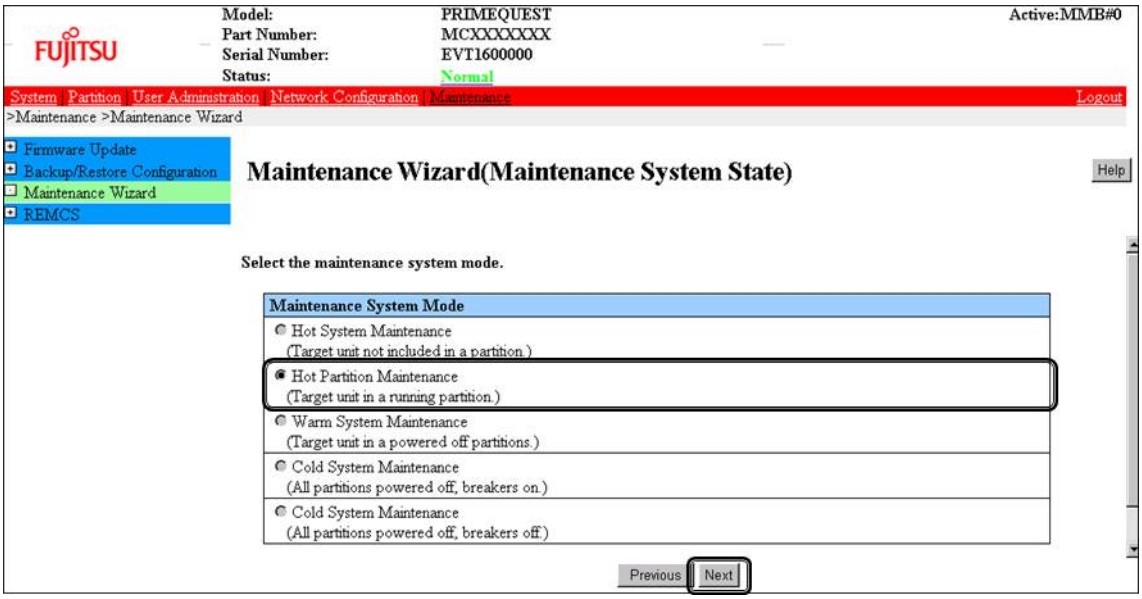
4. Select the radio button of PCI_Box with the particular number, click [Next]
   Example of operation for hot replacing PCI Express card of PCIC#1 mounted on PCI_Box#0



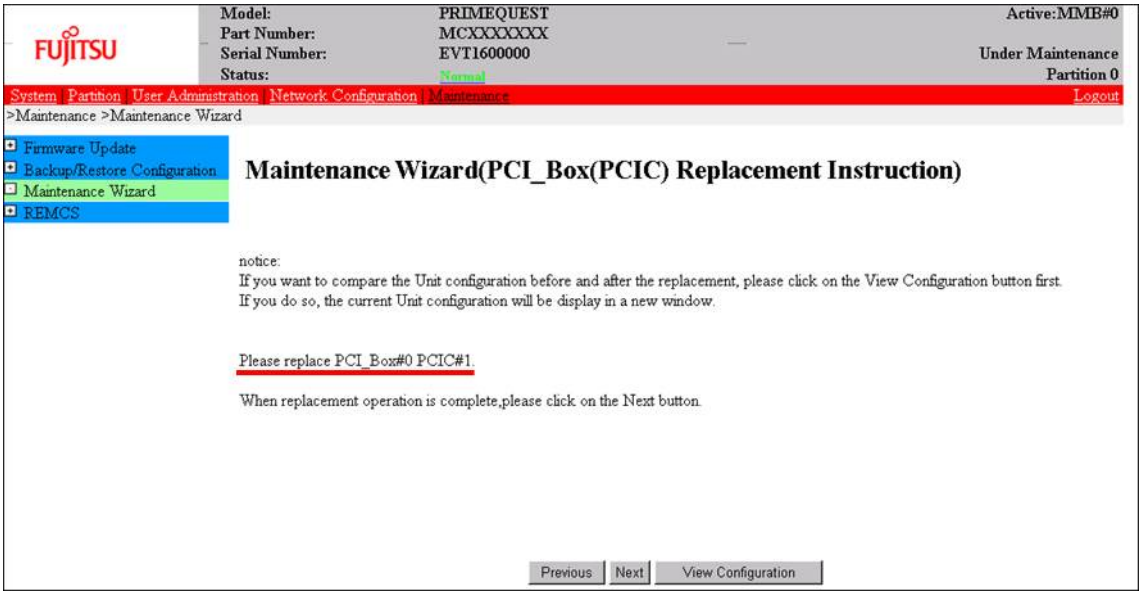
5. Select the radio button of the particular PCIC number and click [Next]


Model: PRIMEQUEST
Part Number: MCXXXXXXX
Serial Number: EVT1600000
Status: Normal
Active:MMB#0
System | Partition | User Administration | Network Configuration | Maintenance
Logout
>Maintenance >Maintenance Wizard
Firmware Update
Backup/Restore Configuration
Maintenance Wizard
REMCS
Maintenance Wizard(PCI_Box(PCIC) Selection)
Help
Select the unit to perform maintenance on.
PCIC# | Power Status | Slot Status | Link Width | Seg/Bus/Dev | Vendor ID | Device ID
0 | On | OK | x8 | 0/21/0 | 8086 | 1528
1 | Standby | Not-present
2 | Standby | Not-present
3 | Standby | Not-present
4 | Standby | Not-present
5 | Standby | Not-present
6 | Standby | Not-present
7 | Standby | Not-present
8 | Standby | Not-present
Previous
Next

6. Select [Hot Partition Maintenance (Target unit in a running partition.)] and click [Next]

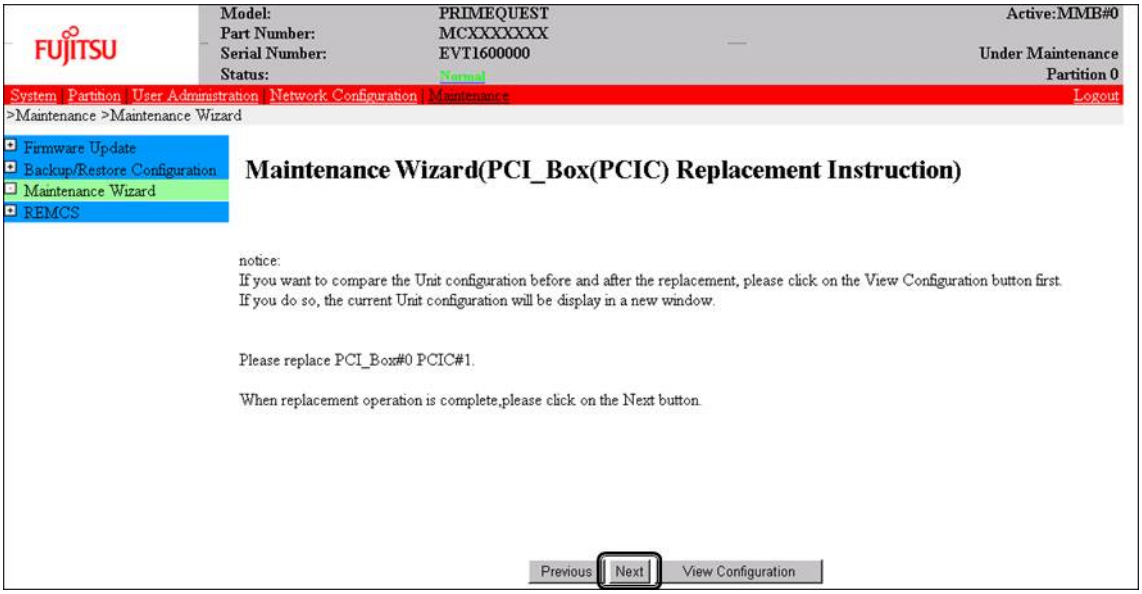


7. Maintenance mode is set (with information area of MMB Web-UI gray out) and then replacement instruction for the particular PCIC appears. Add a new PCI Express card with this window displayed. See the figure in 'B.1 Physical Mounting Locations of Components' to confirm the location of the PCI Express card to be replaced.


Model: PRIMEQUEST
Part Number: MCXXXXXXX
Serial Number: EVT1600000
Status: Normal
Active:MMB#0
Under Maintenance
Partition 0
System | Partition | User Administration | Network Configuration | Maintenance
Logout
>Maintenance >Maintenance Wizard
Firmware Update
Backup/Restore Configuration
Maintenance Wizard
REMCS
Maintenance Wizard(PCI_Box(PCIC) Replacement Instruction)
notice:
If you want to compare the Unit configuration before and after the replacement, please click on the View Configuration button first.
If you do so, the current Unit configuration will be display in a new window.
Please replace PCI_Box#0 PCIC#1.
When replacement operation is complete,please click on the Next button.
Previous
Next
View Configuration

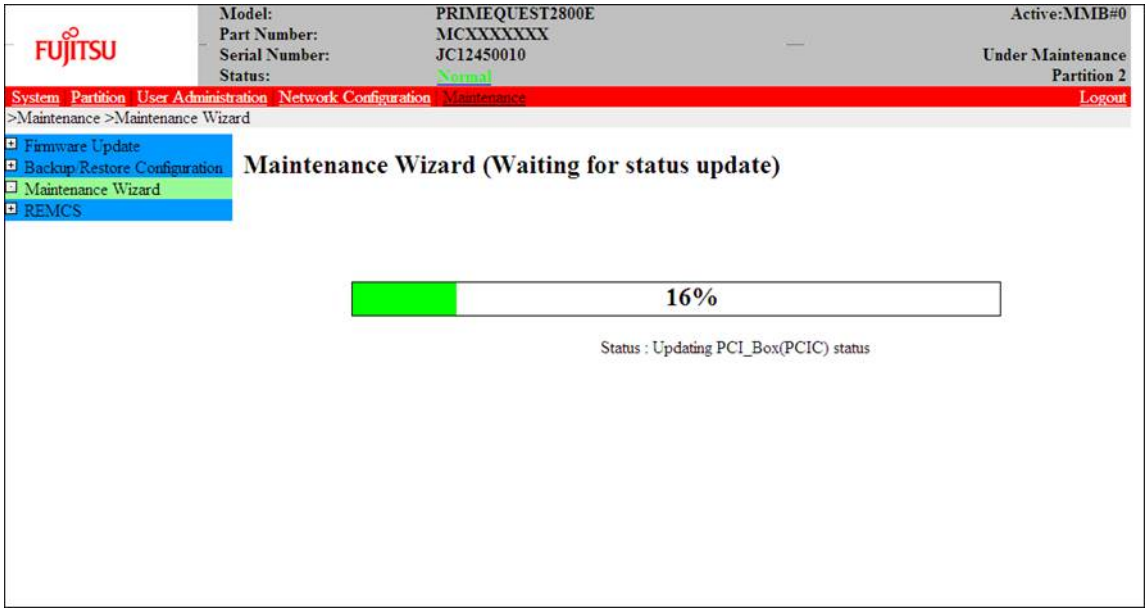
Note
Do NOT click [Next] until adding the PCIC.

8. After replacing the particular PCIC and powering on the particular PCIC slot, click [Next].
   For how to power on the PCIC slot, see “Powering on and off PCI Express slots” in “4.7.2 PCI Express card addition procedure in detail”.
   It is the administrator of your system who power on the PCI Express slot.

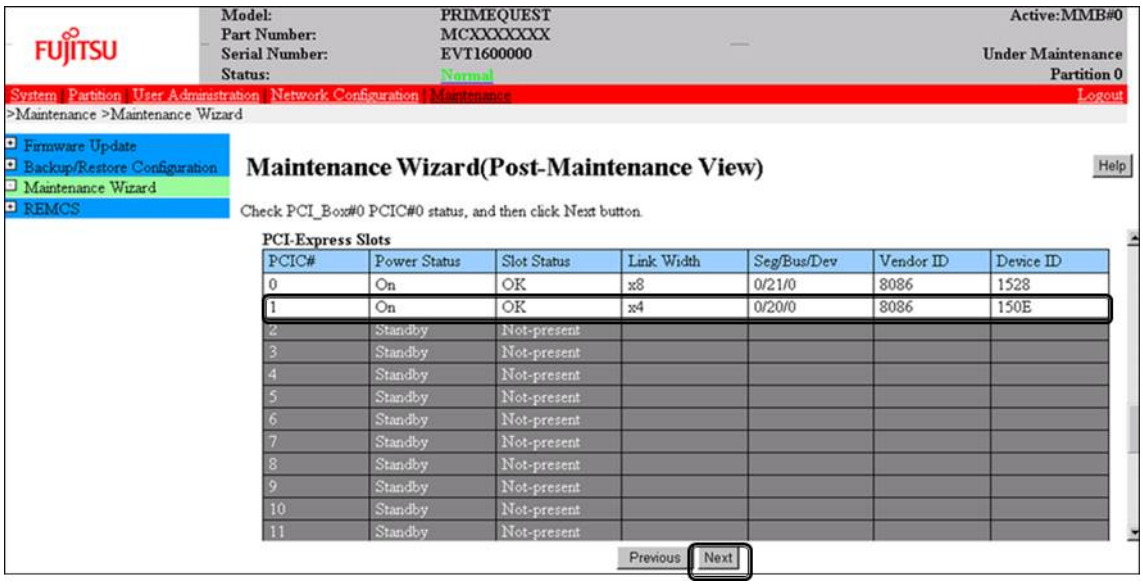

Model: PRIMEQUEST
Part Number: MCXXXXXXX
Serial Number: EVT1600000
Status: Normal
Active:MMB#0
Under Maintenance
Partition 0
System | Partition | User Administration | Network Configuration | Maintenance
Logout
>Maintenance >Maintenance Wizard
Firmware Update
Backup/Restore Configuration
Maintenance Wizard
REMCS
Maintenance Wizard(PCI_Box(PCIC) Replacement Instruction)
notice:
If you want to compare the Unit configuration before and after the replacement, please click on the View Configuration button first.
If you do so, the current Unit configuration will be display in a new window.
Please replace PCI_Box#0 PCIC#1.
When replacement operation is complete,please click on the Next button.
Previous
Next
View Configuration

Note
Ask the administrator of your system to power on the PCI Express slot.

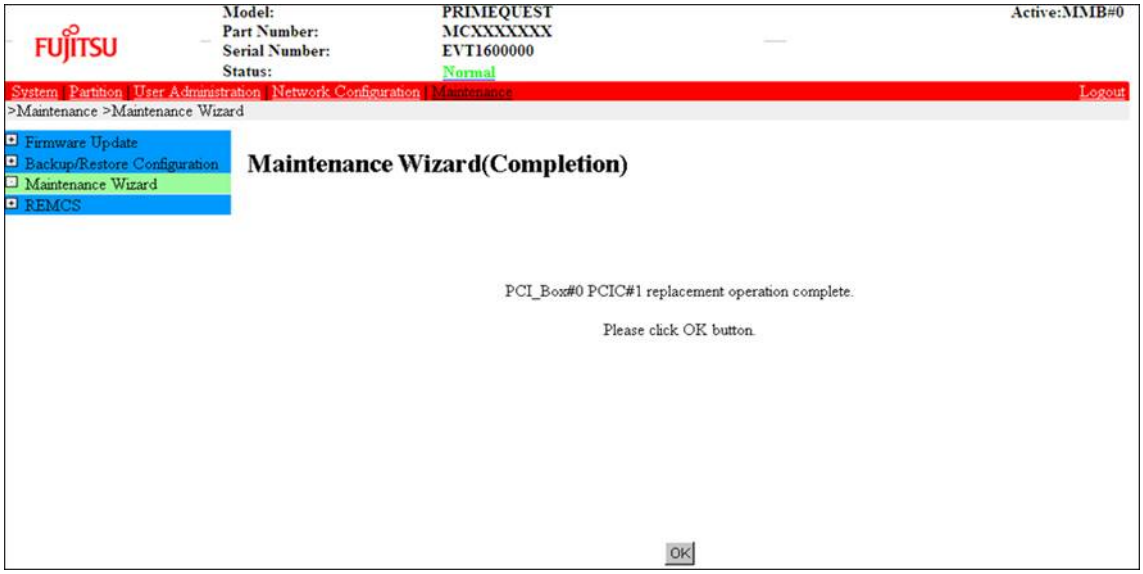
9. The window updating status appears.



10. Check the status of added PCIC and click [Next].


Model: PRIMEQUEST
Part Number: MCXXXXXXX
Serial Number: EVT1600000
Status: Normal
Active:MMB#0
Under Maintenance
Partition 0
System | Partition | User Administration | Network Configuration | Maintenance
Logout
>Maintenance >Maintenance Wizard
Firmware Update
Backup/Restore Configuration
Maintenance Wizard
REMCS
Maintenance Wizard(Post-Maintenance View)
Help
Check PCI_Box#0 PCIC#0 status, and then click Next button.
PCI-Express Slots
PCIC# | Power Status | Slot Status | Link Width | Seg/Bus/Dev | Vendor ID | Device ID
0 | On | OK | x8 | 0/21/0 | 8086 | 1528
1 | On | OK | x4 | 0/20/0 | 8086 | 150E
2 | Standby | Not-present
3 | Standby | Not-present
4 | Standby | Not-present
5 | Standby | Not-present
6 | Standby | Not-present
7 | Standby | Not-present
8 | Standby | Not-present
9 | Standby | Not-present
10 | Standby | Not-present
11 | Standby | Not-present
Previous
Next

11. Confirm that maintenance mode has been released (with information area of MMB Web-UI not gray out) and click [Next].



4.7.3 FC card (Fibre Channel card) addition procedure

The descriptions in this section assume that an FC card is being added.
Notes

- The FC card used for SAN boot does not support hot plugging.
- Although you can hot replace FC card used for dump device of sadump, collecting dump of memory fails until reconfiguring HBA UEFI or extended BIOS with the partition inactive after replacing the FC card.
- This section does not cover configuration changes in peripherals (e.g., UNIT addition or removal for a SAN disk device).
- This manual does not describe how to change the configuration of peripherals such as expanding and removing the unit of SAN disk device.
- To prevent a device name mismatch due to the failure, addition, removal, or replacement of an FC card, access the SAN disk unit by using the by-id name (/dev/disk/by-id/...) for the device name.
- If all the paths in a mounted disk become hidden when an FC card is hot replaced, unmount the disk. Then, execute PCI hot plug.

FC card addition procedure

The procedure for adding new FC cards and peripherals is as follows.

1. Confirm the slot number of the PCI slot by using the following procedure.
   See ‘Confirming the slot number of a PCI Express slot’ in “4.6.2 PCI Express card replacement procedure in detail”.
2. Confirm that power status of the PCI Express slot
   See ‘Checking the power status of a PCI Express slot’ in “4.6.2 PCI Express card replacement procedure in detail”.
3. Physically add the target card by using MMB Maintenance Wizard.
   For details on the operation of replacement, see step 1 to 7 of ‘Operation for Hot replacement of PCI Express card by Maintenance Wizard’ in “4.7.2 PCI Express card addition procedure in detail”.
4. Reconfigure the peripheral according to its manual.
   For example, suppose that the storage device used is ETERNUS and that the host affinity function is used (to set the access right for each server). Their settings would need to be changed as a result of FC card replacement.
5. Connect the FC card cable.
6. Power on the PCI Express slot.
   See ‘Powering on and off PCI Express slots’ in “4.6.2 PCI Express card replacement procedure in detail”.

7. Check whether there is an error in added FC card by MMB Maintenance Wizard.
   This step is performed by the field engineer in charge of your system.
   For details on the operation of replacement, see step 8 to 11 of 'Operation for Hot replacement of PCI Express card by Maintenance Wizard' in "4.7.2 PCI Express card addition procedure in detail".

8. Check the version of the firmware
   It is required that the firmware version of new FC card is same as that of the FC card which had been replaced. If the firmware version of new FC card is coincident with that of the FC card which had been replaced (current firmware version), it is not necessary to update the firmware version of new FC card to current firmware version.
   If the firmware version of new FC card is not coincident with that of the FC card which had been replaced (current firmware version), update the firmware version of new FC card to current firmware version.
   For how to update the firmware version, see Firmware update manual for fibre channel card.
   Note
   If you cannot confirm the firmware version of the FC card before replacing due to the fault of the FC card, check the firmware version of the FC card which is same type as the faulty one to update firmware version.

9. Confirm the incorporation results
   The method of confirming is the same as that is performed in the replacement of FC card. See 'Confirming the FC card incorporation results' in '4.6.3 FC card (Fibre Channel card) replacement procedure'.

4.7.4 Network card addition procedure

NIC (network card) addition using hot plugging needs specific processing before and after PCI slot power-on or power-off. Its procedure also includes the common PCI Express card addition procedure.
The procedure describes operations where a single NIC is configured as one interface. It also describes cases where multiple NICs are bonded together to configure one interface (bonding configuration). For bonding multiple NIC by using PRIMECLUSTER Global Link Services (GLS), see 'PRIMECLUSTER Global Link Service Configuration and Administration Guide Redundant Line Control Function' (J2UZ-7781).

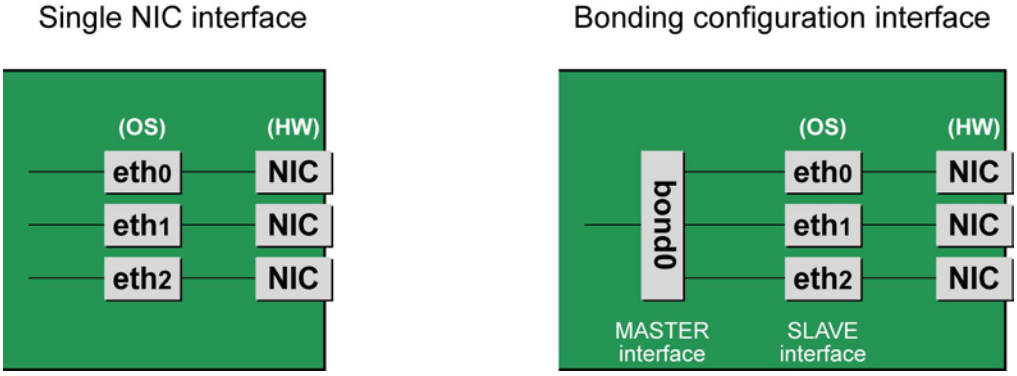


FIGURE 4.4 Single NIC interface and bonding configuration interface

NIC addition procedure

This section describes the procedure for hot plugging only a network card.
Note
When adding multiple NICs, be sure to add them one by one. If you do this with multiple cards at the same time, the correct settings may not be made.

1. Confirm the existing interface names.
   To confirm the interface names, execute the following command.
   Example: eth0 is the only interface on the NIC.

```
# /sbin/ifconfig -a
eth0  Link encap:Ethernet HWaddr 00:0E:0C:70:C3:38
BROADCAST MULTICAST MTU:1500 Metric:1
RX packets:0 errors:0 dropped:0 overruns:0 frame:0
TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RXbytes:0 (0.0 b) TX bytes:0 (0.0 b)
```

```
Lo  Link encap:Local Loopback
inet addr:127.0.0.1 Mask:255.0.0.0
UP LOOPBACK RUNNING MTU:16436 Metric:1
RX packets:0 errors:0 dropped:0 overruns:0 frame:0
TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:0
RXbytes:0 (0.0 b) TX bytes:0 (0.0 b)
```

2. Confirm the slot number of the PCI slot by using the following procedure.
   See ‘Confirming the slot number of a PCI Express slot’ in “4.6.2 PCI Express card replacement procedure in detail”.

3. Confirm that power status of the PCI Express slot
   See ‘Checking the power status of a PCI Express slot’ in “4.6.2 PCI Express card replacement procedure in detail”.

4. Physically add the target NIC by using MMB Maintenance Wizard.
   For details on the operation of replacement, see step 1 to 7 of ‘Operation for Hot replacement of PCI Express card by Maintenance Wizard’ in “4.7.2 PCI Express card addition procedure in detail”
   This step is performed by the field engineer in charge of your system.

5. Power on the PCI Express slot.
   See ‘Powering on and off PCI Express slots’ in “4.6.2 PCI Express card replacement procedure in detail”.

6. Check whether there is an error in added FC card by MMB Maintenance Wizard.
   This step is performed by the field engineer in charge of your system.
   For details on the operation of replacement, see step 8 to 11 of ‘Operation for Hot replacement of PCI Express card by Maintenance Wizard’ in “4.7.2 PCI Express card addition procedure in detail”.

7. Confirm the newly added interface name.
   Powering on the slot creates an interface (ethX) for the added NIC. Execute the following command.
   Compare its results with those of step 1 to confirm the created interface name.

```
# /sbin/ifconfig –a
```

8. Confirm the hardware address of the newly added interface.
   Confirm the hardware address (HWaddr) and the created interface by executing the ifconfig command.
   For a single NIC with multiple interfaces, confirm the hardware addresses of all the created interfaces.
   Example: eth1 is a new interface created for the added NIC.

```
# /sbin/ifconfig -a
eth0  Link encap:Ethernet HWaddr 00:0E:0C:70:C3:38
BROADCAST MULTICAST MTU:1500 Metric:1
RX packets:0 errors:0 dropped:0 overruns:0 frame:0
TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RXbytes:0 (0.0 b) TX bytes:0 (0.0 b)

eth1  Link encap:Ethernet HWaddr 00:0E:0C:70:C3:40
BROADCAST MULTICAST MTU:1500 Metric:1
RX packets:0 errors:0 dropped:0 overruns:0 frame:0
TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RXbytes:0 (0.0 b) TX bytes:0 (0.0 b)

lo  Link encap:Local Loopback
inet addr:127.0.0.1 Mask:255.0.0.0
UP LOOPBACK RUNNING MTU:16436 Metric:1
RX packets:0 errors:0 dropped:0 overruns:0 frame:0
TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:0
RXbytes:0 (0.0 b) TX bytes:0 (0.0 b)
```

9. Create an interface configuration file.
   Create an interface configuration file (/etc/sysconfig/network-scripts/ifcfg-ethX) for the newly created interface as follows. In "HWADDR," set the hardware address confirmed in step 7.
   If multiple NICs are added or if a NIC where multiple interfaces exist is added, create a file for all the interfaces.

The explanation here assumes, as an example, that a name automatically assigned by the system is used. To install a new interface, you can use a new interface name different from the one automatically assigned by the system. Normally, there is no requirement on the name specified for a new interface. To use an interface name other than the one automatically assigned by the system, follow the instructions in step 14 of the 'NIC replacement procedure' in '4.6.4 Network card replacement procedure'.

The contents differ slightly depending on whether the interface is a single NIC interface or a SLAVE interface of the bonding configuration.
[For a single NIC interface]

```
(Example)
DEVICE=eth1              <- Specified interface name
confirmed in step g
NM_CONTROLLED=no
BOOTPROTO=static
HWADDR=00:0E:0C:70:C3:40
BROADCAST=192.168.16.255
IPADDR=192.168.16.1
NETMASK=255.255.255.0
NETWORK=192.168.16.0
ONBOOT=yes
TYPE=Ethernet
```

[SLAVE interface of the bonding configuration]

```
(Example)
DEVICE=eth1              <- Specified interface name
confirmed in step g
NM_CONTROLLED=no
BOOTPROTO=static
HWADDR=00:0E:0C:70:C3:40
MASTER=bondY
SLAVE=yes
ONBOOT=yes
```

Note
Adding the bonding interface itself also requires the MASTER interface configuration file of the bonding configuration.

10. To add a bonding interface, configure the bonding interface driver settings.
    If the bonding interface has already been installed, execute the following command to check the descriptions in the configuration file and confirm the setting corresponding to the bonding interface and driver.
    Example: Description in /etc/modprobe.d/bonding.conf

```
# grep -l bonding /etc/modprobe.d/*
/etc/modprobe.d/bonding.conf
```

Note
If the configuration file is not found or if you are performing an initial installation of the bonding interface, create a configuration file with an arbitrary file name with the ".conf" extension (e.g., /etc/modprobe.d/bonding.conf) in the /etc/modprobe.d directory).
After specifying the target configuration file, add the setting for the newly created bonding interface.

```
alias bondY bonding      <- Add (bondY: Name of the newly
added bonding interface)
```

You can specify options of the bonding driver in this file. Normally, the BONDING_OPTS line in each ifcfg- bondY file is used. Options can be specified to the bonding driver.

11. Activate the added interface.
    Execute the following command to activate the interface. Activate all the necessary interfaces. The activation method depends on the configuration.
    [For a single NIC interface]
    Execute the following command to activate the interface. Activate all the necessary interfaces.

```
# /sbin/ifup ethX
```

[For the bonding configuration]
For a SLAVE interface added to an existing bonding configuration, execute the following command to

incorporate it into the bonding configuration.
Example: bondY is the bonding interface name, and ethX is the name of the interface to be incorporated.

```
# /sbin/ifenslave bondY ethX
```

For a newly added bonding interface with a SLAVE interface, execute the following command to activate the interfaces. You need not execute the ifenslave command individually for the SLAVE interface.

```
# /sbin/ifup bondY
```

4.8 Removing PCI Express cards

This section describes the PCI Express card removal procedure with the PCI Hot Plug function.
The procedure includes common steps for all PCI Express cards and the additional steps required for a specific card function or driver.
Thus, the descriptions cover both the common operations required for all cards (e.g., power supply operations) and the specific procedures required for certain types of card. For details on removal of the cards not described in this section, see the respective product manuals.
There are two ways to perform PCI hot plug:

- Operation by using sysfs
- Operation by using dp commands

You can perform the operation by using dp commands if Dynamic Reconfiguration utility is installed in the partition. If not, be sure to use the operation by using sysfs. Although you can perform the operation by using sysfs even if Dynamic Reconfiguration utility is installed in the partition, it is recommended to perform the operation by using dp commands to prevent wrong operation.
Hereafter, description about the operation by using dp commands starts at ‘For the partition with Dynamic Reconfiguration utility installed’ and description about the operation by sysfs starts at ‘For the partition without Dynamic Reconfiguration utility installed’.
Note
If you hot add PCI Express cards into an IOU, see ‘4.5 IOU hot remove’.

4.8.1 Common removal procedures for all PCI Express cards

1. Performing the required operating system and software operations depending on the PCI Express card type
2. Powering off a PCI slot
3. Removing a PCI Express card
4. Performing the required operating system and software operations depending on the PCI Express card type

Note
This section describes instructions for the operating system and subsystems (e.g., commands, configuration file editing). Be sure to refer to the respective product manuals to confirm the command syntax and impact on the system before performing tasks with those instructions.
The following sections describe card removal with the required instructions (e.g., commands, configuration file editing) for the operating system and subsystems, together with the actual hardware operations. Step 3 is performed by the field engineer in charge of your system.

4.8.2 PCI Express card removal procedure in detail

This section describes operations that must be performed in the PCI Express card removal procedure.

Preparing the software using a PCI Express card

See ‘Preparing the software using a PCI Express card’ in “4.6.2 PCI Express card replacement procedure in detail”.

Confirming the slot number of a PCI Express slot

See ‘Confirming the slot number of a PCI Express slot’ in “4.6.2 PCI Express card replacement procedure in detail”.

Checking the power status of a PCI Express slot

See ‘Checking the power status of a PCI Express slot’ in “4.6.2 PCI Express card replacement procedure in detail”.

Powering off PCI Express slots

See ‘Powering on and off PCI Express slots’ in “4.6.2 PCI Express card replacement procedure in detail”.

4.8.3 FC card (Fibre Channel card) removal procedure

The descriptions in this section assume that an FC card is being removed.
Notes

- The FC card used for SAN boot does not support hot plugging.
- Although you can hot replace FC card used for dump device of sadump, collecting dump of memory fails until reconfiguring HBA UEFI or extended BIOS with the partition inactive after replacing the FC card.
- This section does not cover configuration changes in peripherals (e.g., UNIT addition or removal for a SAN disk device).
- This manual does not describe how to change the configuration of peripherals such as expanding and removing the unit of SAN disk device.
- To prevent a device name mismatch due to the failure, addition, removal, or replacement of an FC card, access the SAN disk unit by using the by-id name (/dev/disk/by-id/...) for the device name.
- If all the paths in a mounted disk become hidden when an FC card is hot replaced, unmount the disk. Then, execute PCI hot plug.

FC card removal procedure

The procedure for removing an FC card and peripherals is as follows.

1. Make the necessary preparations.
   Stop access to the FC card by stopping applications or by other such means.
2. Confirm the slot number of the PCI slot by using the following procedure.
   See ‘Confirming the slot number of a PCI Express slot’ in “4.6.2 PCI Express card replacement procedure in detail”.
3. Power off the PCI Express slot.
   See ‘Powering on and off PCI Express slots’ in “4.6.2 PCI Express card replacement procedure in detail”.
4. Physically remove the target card.

4.8.4 Network card removal procedure

Network card (referred to below as NIC) removal using hot plugging needs specific processing before and after PCI slot power-on or power-off. Its procedure also includes the common PCI Express card removal procedure.
The procedure describes operations where a single NIC is configured as one interface. It also describes cases where multiple NICs are bonded together to configure one interface (bonding configuration). For bonding multiple NIC by using PRIMECLUSTER Global Link Services (GLS), see 'PRIMECLUSTER Global Link Service Configuration and Administration Guide Redundant Line Control Function' (J2UZ-7781).

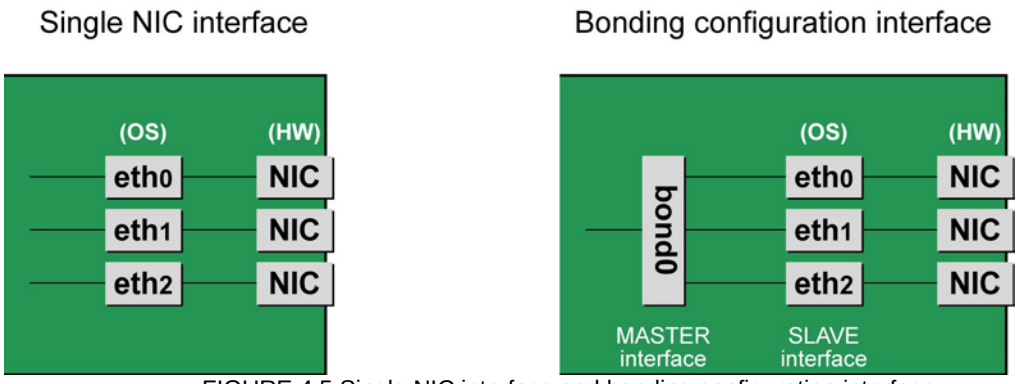


FIGURE 4.5 Single NIC interface and bonding configuration interface

NIC removal procedure

This section describes the procedure for hot plugging only a network card.

Note

When removing multiple NICs, be sure to remove them one by one. If you do this with multiple cards at the same time, the correct settings may not be made.

1. Confirm the slot number of the PCI slot that has the mounted interface.
   Confirm the interface mounting location through the configuration file information and the operating system information.
   First, confirm the bus address of the PCI slot that has the mounted interface to be removed.

```
# ls -l /sys/class/net/eth0/device
lrwxrwxrwx 1 root root 0 Sep 29 09:26 /sys/class/net ¥
/eth0/device
->../../../0000:00:01.2/0000:08:00.2/0000:0b:01.0
```

   The ¥ at the end of a line indicates that there is no line feed.

   Excluding the rest of the directory path, check the part corresponding to the file name in the symbolic link destination file of the output results. In the above example, the underlined part shows the bus address. ("0000:0b:01" in the example)

   Next, check the PCI slot number for this bus address.

```
# grep -il 0000:0b:01 /sys/bus/pci/slots/*/address
/sys/bus/pci/slots/20/address
```

   Read the output file path as shown below, and confirm the PCI slot number.

```
/sys/bus/pci/slots/<slot number>/address
```

   Notes

   If the above file path is not output, it indicates that the NIC is not mounted in a PCI slot (e.g., GbE port in the IOU).

   With the PCI slot number confirmed here, see ‘D.2 Correspondence between PCI Slot Mounting Locations and Slot Numbers’ to check the mounting location, and see also ‘B.1 Physical Mounting Locations of Components’ to identify the physical mounting location corresponding to the PCI slot number. You can confirm that it matches the mounting location of the operational target NIC.

2. Confirm each interface on the same NIC.
   If the NIC has multiple interfaces, you need to remove all of them. Confirm that all the interfaces that have the same bus address in a subsequent command.

```
# ls -l /sys/class/net/*/device | grep "0000:0b:01"
lrwxrwxrwx 1 root root 0 Sep 29 09:26 /sys/class/net ¥
/eth0/device
->../../../0000:00:01.2/0000:08:00.2/0000:0b:01.0
lrwxrwxrwx 1 root root 0 Sep 29 09:26 /sys/class/net ¥
/eth1/device
->../../../0000:00:01.2/0000:08:00.2/0000:0b:01.1
```

   The ¥ at the end of a line indicates that there is no line feed.
   As the above example shows, when more than one interface is displayed, they are on the same NIC.

3. Execute the higher-level application processing required before NIC removal.
   Stop all access to the interface as follows. Stop the application that was confirmed in step 2 as using the interface, or exclude the interface from the target of use by the application.

4. Deactivate the NIC.
   Execute the following command to deactivate all the interfaces that you confirmed in step 2.
   The applicable command depends on whether the target interface is a single NIC interface or the SLAVE interface of a bonding device.

   [For a single NIC interface]

   ```
   # /sbin/ifdown ethX
   ```

   If the single NIC interface has a VLAN device, you also need to remove the VLAN interface. Perform the following operations. (These operations precede deactivation of the physical interface.)

   ```
   # /sbin/ifdown ethX.Y
   # /sbin/vconfig rem ethX.Y
   ```

   [For the interface under bonding]
   If the bonding device is operating in mode 1, use the following steps for safety purposes on the SLAVE interface to be removed to exclude it from operation. In any other mode, removing it immediately should not cause any problems. Confirm that the SLAVE interface is the interface currently being used for communication.

   ```
   # cat /sys/class/net/bondY/bonding/active_slave
   ```

   If the displayed interface name corresponds to the SLAVE interface to be removed, execute the following command to switch to communicating now with the other SLAVE interface.

   ```
   # /sbin/ifenslave -c bondY ethZ
   (ethZ: bondY-configured interface not subject to hot
   replacement)
   ```

   Finally, remove the SLAVE interface being replaced, from the bonding configuration. Immediately after being removed, the interface is automatically no longer used.

   ```
   # /sbin/ifenslave -d bondY ethX
   ```

   To remove the interfaces, including the bonding device, deactivate them collectively by executing the following command.

   ```
   # /sbin/ifdown bondY
   ```

5. Power off the PCI slot.
   See ‘Powering on and off PCI Express slots’ in “4.6.2 PCI Express card replacement procedure in detail”.

6. Remove the NIC from the PCI Express slot.

7. Remove the interface configuration file.
   Delete the configuration files of all the interfaces confirmed in step 2, by executing the following command.

   ```
   # rm /etc/sysconfig/network-scripts/ifcfg-ethX
   ```

   When deleting a bonding device, also delete the related bonding items (ifcfg-bondY files).

8. Edit the settings in the udev function rule file.
   The entries of the interface assigned to the removed NIC still remain in the udev function rule file, /etc/udev/ rules.d/70-persistent-net.rules. Leaving the entries will affect the determination of interface names for replacement cards or added cards in the future. For this reason, delete or comment out those entries.
   The following example shows editing of the udev function rule file, /etc/udev/rules.d/70-persistent-net.rules. (In this example, the file is edited when the eth10 interface is removed.)
   [Example of descriptions in the file before editing]

   ```
   SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ¥
   ATTR{address}=="00:0e:0c:70:c3:38", ATTR{type}=="1", ¥
   KERNEL=="eth*", NAME="eth0"
    :
    :
   SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ¥
   ATTR{address}=="00:0e:0c:70:c3:40", ATTR{type}=="1", ¥
   KERNEL=="eth*", NAME="eth10"
   ```

The ¥ at the end of a line indicates that there is no line feed.

[Example of descriptions in the file after editing]
The entries for the eth10 interface are commented out.

```
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ¥
ATTR{address}=="00:0e:0c:70:c3:38", ATTR{type}=="1", ¥
KERNEL=="eth*", NAME="eth0"
 :
 :
# SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ¥
ATTR{address}=="00:0e:0c:70:c3:40", ATTR{type}=="1", ¥
KERNEL=="eth*", NAME="eth10"
```

The ¥ at the end of a line indicates that there is no line feed.
Do this editing for all the interfaces confirmed in step 2.

9. Reflect the udev function rules.
   Since rules are not automatically reflected in udev at the removal time, take action to reflect the new rules in udev.

   ```
   # udevadm control --reload-rules
   ```

10. If the removed interface includes any bonding interface, delete the driver setting of the interface.
    When removing a bonding interface, be sure to delete the setting corresponding to the bonding interface and driver. Execute the following command to check the descriptions in the configuration file, and confirm the setting corresponding to the bonding interface and driver.

    Example: Description in /etc/modprobe.d/bonding.conf

    ```
    # grep -l bonding /etc/modprobe.d/*

    /etc/modprobe.d/bonding.conf
    ```

    Edit the file that describes the setting, and delete the setting of the removed bonding interface.

    ```
    alias bondY bonding        <- Delete
    ```

    bondY: Name of the removed bonding interface
    Note
    There are no means to dynamically remove the MASTER interface (bondY) of the bonding configuration. If you want to remove the entire bonding interface, you can disable the bonding configuration and remove all the SLAVE interfaces but the MASTER interface itself remains.

11. Execute the higher-level application processing required after NIC removal.
    Perform the necessary post processing (such as changing application settings or restarting an application) for the operations performed for the higher-level applications in step 3.

4.8.5 Hot removal procedure for iSCSI (NIC)

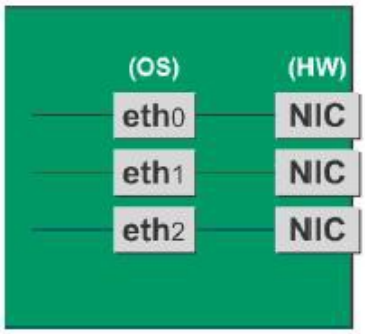
When performing hot replacement of NICs used for iSCSI connection, use the following procedures.

- 4.8.1 Common removal procedures for all PCI Express cards
- 4.8.2 PCI Express card removal procedure in detail
- 4.8.3 FC card (Fibre Channel card) removal procedure

A supplementary explanation of the procedure follows.

Prerequisites for iSCSI (NIC) hot removal

- The prerequisites for iSCSI (NIC) hot replacement are as follows.
- The storage connection is established on a multipath using DM-MP (Device-Mapper Multipath) or ETERNUS multidriver (EMPD).
- To replace more than one iSCSI card, one card at a time will be replaced.
- A single NIC is configured as one interface.



Work to be performed before iSCSI (NIC) removal

For iSCSI (NIC) hot replacement, be sure to follow the procedure below when performing Step 3 of the 'NIC removal procedure' in '4.8.4 Network card removal procedure'

1. Perform the work for suppressing access to the iSCSI connection interface.

   a Confirm the state of multiple path by DM-MP (*1) or EMPD (*2).

   b Use the iscsiadm command to log out from the path (iqn) through which the iSCSI card to be replaced is routed, and disconnect the session.
   Example which confirms the state of session before disconnecting:

```
# /sbin/iscsiadm -m session
tcp: [1] 192.168.1.64:3260,1 iqn.2000-
09.com.fujitsu:storage-system.eternus-
dx400:00001049.cm0ca0p0
tcp: [2] 192.168.2.66:3260,3 iqn.2000-
09.com.fujitsu:storage-system.eternus-
dx400:00001049.cm1ca0p0
```

   Example which logout path going through a NIC to be replaced:

```
# /sbin/iscsiadm -m node -T iqn.2000-09.com.fujitsu:storage-
system.eternus-dx400:00001049.cm1ca0p0 -p 192.168.2.66:3260
–logout
```

   c Use the iscsiadm command to confirm that the target session has been disconnected.
   Example which confirms the state of session after disconnecting

```
# /sbin/iscsiadm -m session
tcp: [1] 192.168.1.64:3260,1 iqn.2000-
09.com.fujitsu:storage-system.eternus-
dx400:00001049.cm0ca0p0
```

   d You can confirm the disconnection of sessions on multipath products using DM-MP or ETERNUS multidriver.
   *1: Write down the DM-MP display contents at the session disconnection.
   Example of DM-MP display before disconnecting path

```
# /sbin/multipath -ll
mpath1 (36000b5d0006a0000006a104900000000) dm-0
FUJITSU,ETERNUS_DX400
[size=50G][features=0][hwhandler=0][rw]
¥_ round-robin 0 [prio=2][active]
 ¥_ 3:0:0:0 sdb 8:16  [active][ready]
 ¥_ 4:0:0:0 sdc 8:32  [active][ready]
```

   Example of DM-MP display after disconnecting path

```
# /sbin/multipath -ll
mpath1 (36000b5d0006a0000006a104900000000) dm-0
FUJITSU,ETERNUS_DX400
[size=50G][features=0][hwhandler=0][rw]
¥_ round-robin 0 [prio=1][enabled]
 ¥_ 3:0:0:0 sdb 8:16  [active][ready]
```

*2: See the ETERNUS Multipath Driver User's Guide (For Linux).

CHAPTER 5 Replacement of HDD/SSD

This chapter describes how to replace Hard Disk Drives (HDD) or Solid State Drives (SSD).

5.1 Hot replacement of HDD/SSD with Hardware RAID configuration

This section describes how to replace Hard Disk Drives (HDD) or Solid State Drives (SSD) with Hardware RAID configuration.

5.1.1 Hot replacement of failed HDD/SSD with RAID0 configuration

This section describes the workflow of hot replacement of HDD or SSD with RAID0 configuration when one HDD or SSD fails.
Remarks

- Hot replacement of HDD or SSD can be performed only when HDDs or SSDs are mirror configuration by using software such as PRIMECLUSTER GDS.
- Step1 and Step2 are performed by field engineers in charge of your system.

1. Replace HDD or SSD with the Alarm LED on by using MMB Maintenance Wizard.
2. Create a logical drive with RAID0 configuration by using MMB Maintenance Wizard.
3. Confirm whether [Status] of replaced HDD or SSD has been already ‘Operational’ by MMB Web-UI. How to confirm the status differs depending on whether the HDD or SSD is included in a SB or in a DU.
   - For replacement of a HDD or SSD included in a SB
     Confirm whether [Status] of replaced HDD or SSD has been already ‘Operational’ by [System] – [SB] – [SBx] window of MMB Web-UI. For details on [SBx] window, see ‘1.2.13 [SB] menu’ in “PRIMEQUEST 2000 series *Tool Reference*” (C122-E177EN).
   - For replacement of a HDD or SSD included in a DU
     Confirm whether [Status] of replaced HDD or SSD has been already ‘Operational’ by [System] – [DU] – [DUx] window of MMB Web-UI. For details on [SBx] window, see ‘1.2.15 [DU] menu’ in “PRIMEQUEST 2000 series *Tool Reference*” (C122-E177EN).

5.1.2 Hot replacement of failed HDD/SSD with RAID 1, RAID 1E, RAID 5, RAID 6, or RAID 10 configuration

This section describes the workflow of hot replacement of HDD or SSD with RAID 1, RAID 1E, RAID 5, RAID 6, or RAID 10 configuration when one HDD or SSD fails.
Remarks

- Step1 is performed by field engineers in charge of your system.
- Copy back may run after rebuild has been completed.

1. Replace the HDD or SSD with the Alarm LED on by using MMB Maintenance Wizard.
2. Confirm whether a rebuild of the HDD or SSD has been already completed by using the below steps depending on whether a spare disk is set or not.
   - If not set a spare disk
     A rebuild is automatically performed to replaced HDD or SSD. Then, the Alarm LED of the HDD or SSD starts blinking.
     Confirm whether a rebuild of replaced HDD or SSD has been already completed by MMB Web-UI. How to confirm the status differs depending on whether the HDD or SSD is included in a SB or in a DU.
     - For replacement of a HDD or SSD included in a SB
       Confirm whether [Status] of replaced HDD or SSD has been already ‘Operational’ by [System] – [SB] – [SBx] window of MMB Web-UI. For details on [SBx] window, see ‘1.2.13 [SB] menu’ in “PRIMEQUEST 2000 series *Tool Reference*” (C122-E177EN).

  - For replacement of a HDD or SSD included in a DU
    Confirm whether [Status] of replaced HDD or SSD has been already 'Operational' by [System] – [DU] – [DUx] window of MMB Web-UI. For details on [SBx] window, see '1.2.15 [DU] menu' in "PRIMEQUEST 2000 series *Tool Reference*" (C122-E177EN).

- If set a spare disk:
  A rebuild has been already automatically performed to the HDD or SSD set as a spare disk. The replaced HDD or SSD automatically becomes a spare disk. The Alarm LED of the HDD or SSD goes out.
  Confirm whether [Status] of replaced HDD or SSD has been already 'Hot spare' by MMB Web-UI. How to confirm the status differs depending on whether the HDD or SSD is included in a SB or in a DU.

  - For replacement of a HDD or SSD included in a SB
    Confirm whether [Status] of replaced HDD or SSD has been already 'Hot Spare' by [System] – [SB] – [SBx] window of MMB Web-UI. For details on [SBx] window, see '1.2.13 [SB] menu' in "PRIMEQUEST 2000 series *Tool Reference*" (C122-E177EN).

  - For replacement of a HDD or SSD included in a DU
    Confirm whether [Status] of replaced HDD or SSD has been already 'Hot Spare' by [System] – [DU] – [DUx] window of MMB Web-UI. For details on [SBx] window, see '1.2.15 [DU] menu' in "PRIMEQUEST 2000 series *Tool Reference*" (C122-E177EN).

5.2 Preventive replacement of HDD/SSD with Hardware RAID configuration

This section describes how to perform the preventive replacement of Hard Disk Drives (HDD) or Solid State Drives (SSD) with Hardware RAID configuration.

5.2.1 Preventive replacement of failed HDD/SSD with RAID0 configuration

This section describes the workflow of preventive replacement of HDD or SSD with RAID0 configuration.

For mirror configuration

Hot preventive replacement can be performed if HDDs or SSDs are mirror configuration by software such as PRIMECLUSTER GDS.
Remarks

- Step1 and Step2 are performed by field engineers in charge of your system.
- If HDD or SSD other than target HDD or SSD for preventive replacement fails in step3, field engineers in charge of your system replace the failed HDD or SSD.

1. Replace HDD or SSD with the Alarm LED on by using MMB Maintenance Wizard.
2. Create a logical drive with RAID0 configuration by using MMB Maintenance Wizard.
3. Confirm whether [Status] of replaced HDD or SSD has been already 'Operational' by MMB Web-UI. How to confirm the status differs depending on whether the HDD or SSD is included in a SB or in a DU.

   - For replacement of a HDD or SSD included in a SB
     Confirm whether [Status] of replaced HDD or SSD has been already 'Operational' by [System] – [SB] – [SBx] window of MMB Web-UI. For details on [SBx] window, see '1.2.13 [SB] menu' in "PRIMEQUEST 2000 series *Tool Reference*" (C122-E177EN).

   - For replacement of a HDD or SSD included in a DU
     Confirm whether [Status] of replaced HDD or SSD has been already 'Operational' by [System] – [DU] – [DUx] window of MMB Web-UI. For details on [SBx] window, see '1.2.15 [DU] menu' in "PRIMEQUEST 2000 series *Tool Reference*" (C122-E177EN).

For non-mirror configuration (replacement with the partition power off)

If HDDs or SSDs are not mirror configuration, preventive replacement of a HDD or SSD has to be performed with the partition power off
Remarks

- If HDD or SSD other than target HDD or SSD for preventive replacement fails in step3, field engineers in charge of your system replace the failed HDD or SSD.
- Step7 is performed by the field engineer in charge of your system.

1. Back up data in all HDDs or SSDs connected to the RAID controller card to which the target HDD or SSD for preventive replacement is connected.
2. Confirm the HDD or SSD which S.M.A.R.T. has predicted to fail by MMB Web-UI checking mounting location. How to confirm the status differs depending on whether the HDD or SSD is included in a SB or in a DU.
   - When S.M.A.R.T predicted to fail a HDD or SSD included in a SB
     A HDD or SSD which S.M.A.R.T has predicted to fail is a HDD or SSD with its [status] 'SMART error' in [System] – [SB] – [SBx] window of MMB Web-UI. For details on [SBx] window, see '1.2.13 [SB] menu' in "PRIMEQUEST 2000 series *Tool Reference*" (C122-E177EN).
   - When S.M.A.R.T predicted to fail a HDD or SSD included in a DU
     A HDD or SSD which S.M.A.R.T has predicted to fail is a HDD or SSD with its [status] 'SMART error' in [System] – [DU] – [DUx] window of MMB Web-UI. For details on [DUx] window, see '1.2.13 [SB] menu' in "PRIMEQUEST 2000 series *Tool Reference*" (C122-E177EN).
3. If HDD or SSD other than target HDD or SSD for preventive replacement fails, replace the failed HDD or SSD prior to perform preventive replacement
4. Restart the partition. Start WebBIOS from Boot Manager front page.
5. Perform Clear Configuration or delete a VD.
   - For there is only one VD with RAID 0:
     - Select [Clear Configuration] from [Configuration Wizard] in [WebBIOS] and click [Next].
     - If below massage appears, click [Yes].
       "This is Destructive Operation.
       Original configuration and data will be lost.
       Select Yes, if desired so."
       Note
       If you perform [Clear Configuration], all data are deleted. [Configuration Preview] window appears.
   - For the VD number of RAID 0 group is the most biggest among the environment where there are multiple VDs:
     Select the particular VD and delete it.
6. When the data has been erased, exit WebBIOS and power off the partition.
7. Replace the HDD or SSD which S.M.A.R.T. predicted to fail.
8. Start the partition. Then, start WebBIOS from the Boot Manager front page.
9. In WebBIOS, create an array configuration.
10. Restore backup data or reinstall the operating system.

5.2.2 Preventive replacement of failed HDD/SSD with RAID 1, RAID 1E, RAID 5, RAID 6, or RAID 10 configuration

This section describes the workflow of preventive replacement of HDD or SSD with RAID 1, RAID 1E, RAID 5, RAID 6, or RAID 10 configuration.

Remarks

From step1 to step6 are performed by the field engineer in charge of your system.

1. Make data consistent by MMB Maintenance Wizard to make the HDD or SSD no error.
2. Turn on Alarm LED of the HDD or SSD which S.M.A.R.T. predicted to fail by MMB Maintenance Wizard.
3. Confirm the location of the HDD or SSD, tuning off the Alarm LED by MMB Maintenance Wizard.
4. Make the target HDD or SSD offline by MMB Maintenance Wizard
5. Confirm that [Status] of the target HDD or SSD is 'Failed', 'Offline' or 'Available'.
6. Replace the HDD or SSD of which you confirmed in step2 that Alarm LED turns on

7. Confirm whether a rebuild of the HDD or SSD has been already completed by using the below steps depending on whether a spare disk is set or not.

   - If not set a spare disk
     A rebuild is automatically performed to replaced HDD or SSD. Then, the Alarm LED of the HDD or SSD starts blinking.
     Confirm whether a rebuild of replaced HDD or SSD has been already completed by MMB Web-UI. How to confirm the status differs depending on whether the HDD or SSD is included in a SB or in a DU.

     - For replacement of a HDD or SSD included in a SB
       Confirm whether [Status] of replaced HDD or SSD has been already 'Operational' by [System] – [SB] – [SBx] window of MMB Web-UI. For details on [SBx] window, see '1.2.13 [SB] menu' in "PRIMEQUEST 2000 series *Tool Reference*" (C122-E177EN).

     - For replacement of a HDD or SSD included in a DU
       Confirm whether [Status] of replaced HDD or SSD has been already 'Operational' by [System] – [DU] – [DUx] window of MMB Web-UI. For details on [SBx] window, see '1.2.15 [DU] menu' in "PRIMEQUEST 2000 series *Tool Reference*" (C122-E177EN).

   - If set a spare disk:
     A rebuild has been already automatically performed to the HDD or SSD set as a spare disk. The replaced HDD or SSD automatically becomes a spare disk. The Alarm LED of the HDD or SSD goes out.
     Confirm whether [Status] of replaced HDD or SSD has been already 'Hot spare' by MMB Web-UI. How to confirm the status differs depending on whether the HDD or SSD is included in a SB or in a DU.

     - For replacement of a HDD or SSD included in a SB
       Confirm whether [Status] of replaced HDD or SSD has been already 'Hot Spare' by [System] – [SB] – [SBx] window of MMB Web-UI. For details on [SBx] window, see '1.2.13 [SB] menu' in "PRIMEQUEST 2000 series *Tool Reference*" (C122-E177EN).

     - For replacement of a HDD or SSD included in a DU
       Confirm whether [Status] of replaced HDD or SSD has been already 'Hot Spare' by [System] – [DU] – [DUx] window of MMB Web-UI. For details on [SBx] window, see '1.2.15 [DU] menu' in "PRIMEQUEST 2000 series *Tool Reference*" (C122-E177EN).

5.3 Replacement of HDD/SSD in case hot replacement cannot be performed

In below cases, hot replacement of the failed HDD or SSD cannot be performed.

- Case where multiple deadlock occurs
  Multiple deadlock occurs when more than one hard disk fail to be recognized at the same time.
- The HDD or SSD is RAID0 configuration and it is not mirror configuration by PRIMECLUSTER GDS.
  If a HDD or SSD fails in this case, it is required to reconfigure the Hardware RAID after replacing HDD or SSD. Recover from back up data because data in failed HDD or SSD is not guaranteed.

When replacing the HDD or SSD, it is has to be done with the partition power off. The workflow is described below.

Remarks

Step2 is performed by the field engineer in charge of your system.

1. Turn off the power to the partition.
2. Replace the HDD or SSD.
3. Restart the partition, and then start WebBIOS from the Boot Manager front page.
4. Create the array configuration with WebBIOS.
5. Restore the data for backup.

CHAPTER 6 PCI Express card Hot Maintenance in Windows

This chapter describes the hot plugging procedure for PCI Express cards in Windows. Hot plugging is supported only in Windows Server 2008 R2/ Windows Server 2012/ Windows Server 2012 R2.
This procedure is for the PRIMEQUEST 2400E/2800E/2800B.

6.1 Overview of Hot Maintenance

The hot plugging procedure includes the common steps for all PCI Express cards and the additional steps required for a card function or driver. This section describes both the operations required for all cards and the operations required for combinations with a specific card and specific software.

Overview of hot plugging

You can add and replace cards by using the hot plugging supported by Windows Server 2008 R2 and 2012. This chapter describes the operating system commands required for card replacement, together with the actual hardware operations. For details on the overall flow, see 6.1.1 Overall flow.

Common hot plugging procedure for PCI Express cards

This chapter concretely describes the required tasks in the common replacement procedure for all PCI Express cards. For details on the common hot plugging procedure for PCI Express cards, see 6.2 Common Hot Plugging Procedure for PCI Express cards.

Hot plugging procedure for each type of card

This chapter describes procedures with the required additional steps for certain cards. The section contains procedures for NICs (network cards) and FC cards (Fibre Channel cards). For details on NIC hot plugging, see 6.3 NIC Hot Plugging. For details on FC card hot plugging, see 6.4 FC Card Hot Plugging.

For the respective procedures required for cards other than the above cards, see the related hardware and software manuals as well as this chapter. Usually, these cards (NICs and FC cards) are used in a combination with duplication software (Intel PROSET/ETERNUS multipath driver). This chapter describes the procedure needed for a NIC or FC card used in combination with such duplication software, and the procedure needed for a NIC or FC card used alone.

Note

The procedures include operations for related software. Depending on the configuration, the procedures may differ or require additional operations. When doing the actual work, be sure to see the related product manuals.

6.1.1 Overall flow

This section shows the overall flow of hot plugging.
The following procedures are required for all types of cards for PCI Hot Plug support in the current version of Windows Server 2008 R2, 2012 and 2012 R2. If an operation is required for a specific type of PCI Express card, the operation is described in the relevant procedure. The contents of an operation depend on the software to be combined with the card.

Replacement procedure

1. Confirm the physical location, segment number, and bus number.
2. Disable PCI cards to be replaced by using Device Manager.
3. Stop PCI cards to be replaced by using safely remove devices from computer.
4. Replace PCI card by using MMB Maintenance Wizard. [Field Engineer's (FE) work]
5. Confirm the replaced card by using Device Manager.

Note

In case of multi-function card, there are some cards that have same segment number, same bus number, and different function numbers.
In this case, please perform Step.2 and No.3 of follows respectively.

Addition procedure

1. Confirm physical location of added PCI card.
2. Add PCI card by using MMB Maintenance Wizard. [FE's work]
3. Confirm added PCI card by using MMB Maintenance Wizard.

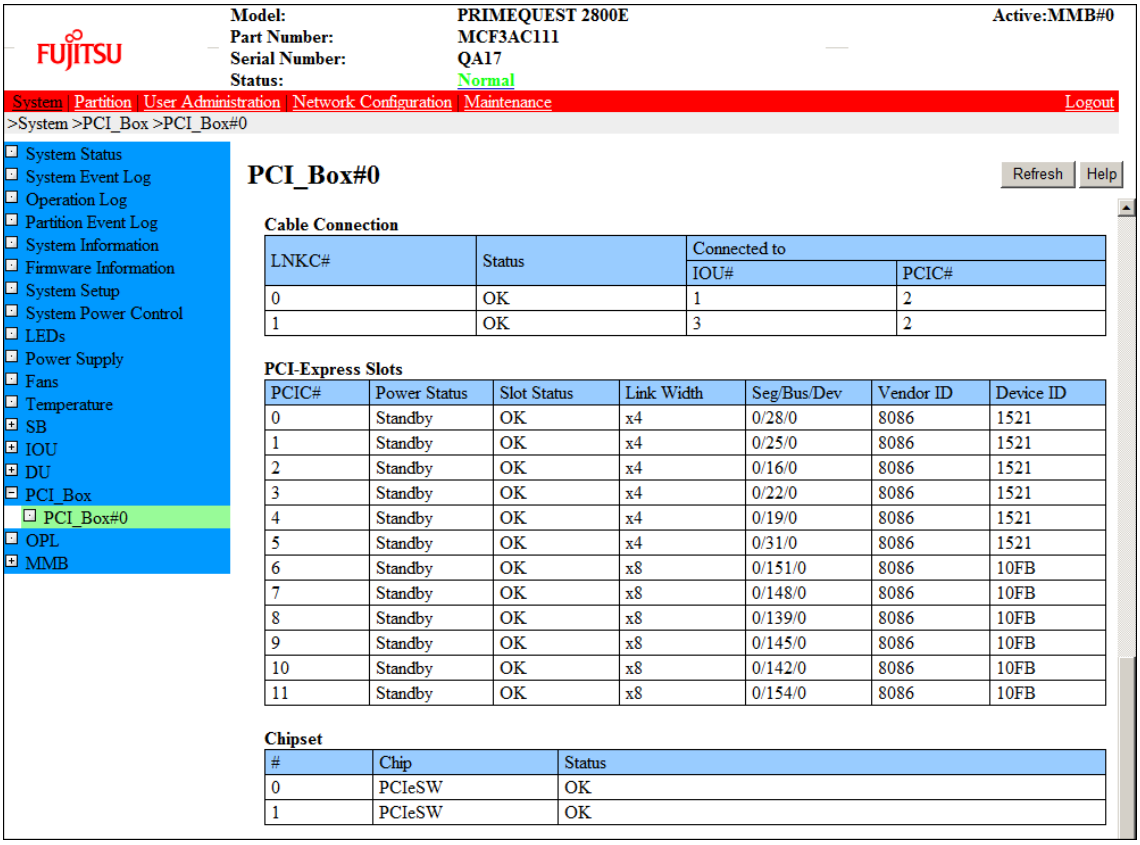
Note
FE will perform work of step 4 of replacement procedure and step 2 of addition procedure.

6.2 Common Hot Plugging Procedure for PCI Express cards

This section describes the PCI Express card replacement procedure that does not involve additional steps (e.g., when a redundant application is not used).
Note
Insert the PCI Express card securely.

6.2.1 Replacement procedure

1. Confirm the physical location, segment number, and bus number.
   a Identify the mounting location of the PCI card to be replaced.
   See the figure in B.1 Physical Mounting Locations of Components to check the mounting location (board and slot) of the PCI card to be replaced.
   b Confirm segment number and bus number.
   Open component information corresponded to confirmed physical location with step a by using MMB Web-UI.
   For this example, it is explained the method to confirm segment number and bus number of PCI slot#1 in PCI_Box#0. Select [System] – [PCI_Box] – [PCI_Box#0] in MMB Web-UI, and see Seg/Bus/Dev of PCIC#1 at PCI-Express Slots in [PCI_Box#0] information.
   'Seg' is segment number, and 'Bus' is Bus number in Seg/Bus/Dev information.
   This segment number and bus number is the information to confirm by using Device Manager.



FUJITSU

Model: PRIMEQUEST 2800E
Part Number: MCF3AC111
Serial Number: QA17
Status: Normal
Active:MMB#0

System | Partition | User Administration | Network Configuration | Maintenance | Logout

>System >PCI_Box >PCI_Box#0

- System Status
- System Event Log
- Operation Log
- Partition Event Log
- System Information
- Firmware Information
- System Setup
- System Power Control
- LEDs
- Power Supply
- Fans
- Temperature
- SB
- IOU
- DU
- PCI_Box
  - PCI_Box#0
- OPL
- MMB

PCI_Box#0

Refresh Help

Cable Connection

LNKC#	Status	Connected to	
		IOU#	PCIC#
0	OK	1	2
1	OK	3	2

PCI-Express Slots

PCIC#	Power Status	Slot Status	Link Width	Seg/Bus/Dev	Vendor ID	Device ID
0	Standby	OK	x4	0/28/0	8086	1521
1	Standby	OK	x4	0/25/0	8086	1521
2	Standby	OK	x4	0/16/0	8086	1521
3	Standby	OK	x4	0/22/0	8086	1521
4	Standby	OK	x4	0/19/0	8086	1521
5	Standby	OK	x4	0/31/0	8086	1521
6	Standby	OK	x8	0/151/0	8086	10FB
7	Standby	OK	x8	0/148/0	8086	10FB
8	Standby	OK	x8	0/139/0	8086	10FB
9	Standby	OK	x8	0/145/0	8086	10FB
10	Standby	OK	x8	0/142/0	8086	10FB
11	Standby	OK	x8	0/154/0	8086	10FB

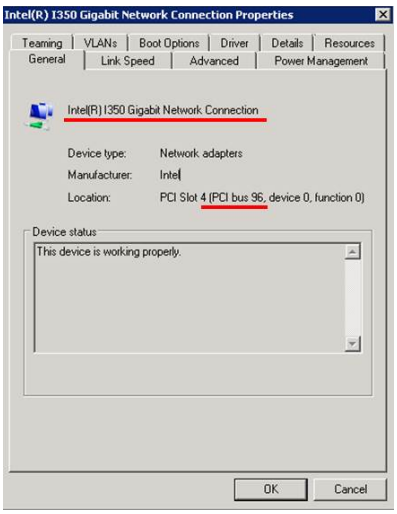
Chipset

#	Chip	Status
0	PCIeSW	OK
1	PCIeSW	OK

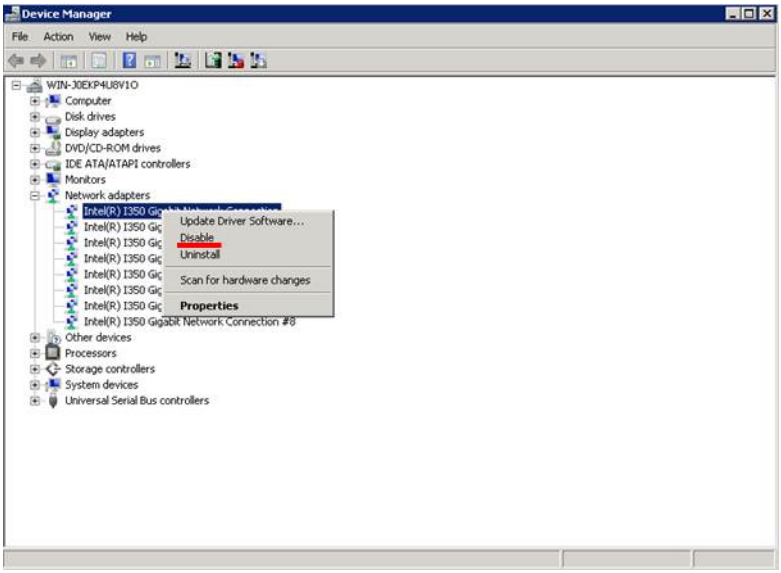
Note
In case of multi-function card, there are some cards that have same segment number, same bus number, and different function numbers.
In this case, please perform Step.2 and Step.3 of follows respectively.

2. Disable target PCI cards by using Device manager.

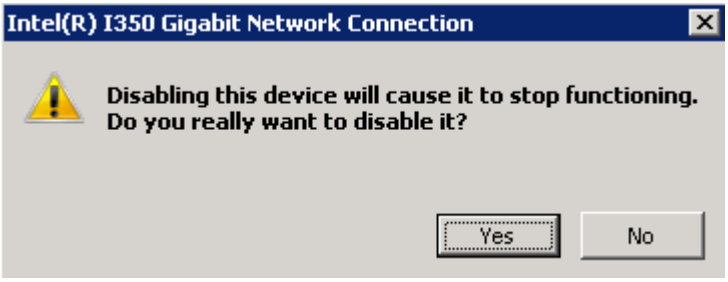
   a Confirm target PCI card in Device Manager.
   Open Device Manager, and identify target device with confirmed segment number and bus number in step 1-b.
   Select interface of the type of replaced PCI card, and reference property.
   Select [General], see [Location], and confirm that the segment number and bus number is corresponded to target device or not. You need target device name in step 3, confirm it in advance.



   b Disable replaced PCI card with Device Manager.
   Select target identified device in step a, and disable it by using Device Manager.



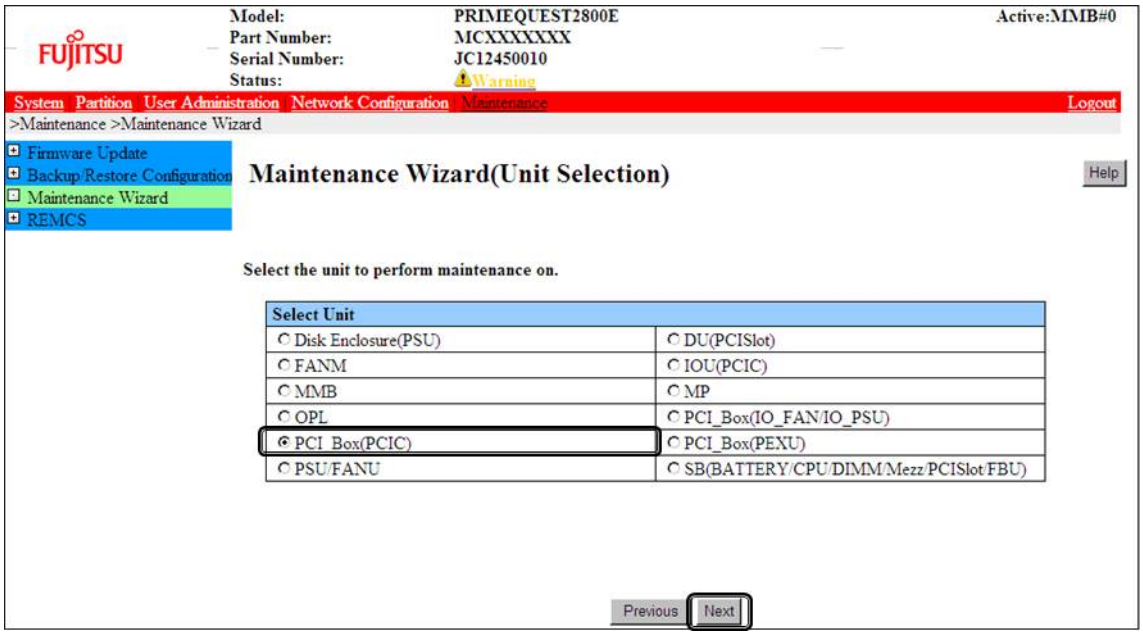
Follow dialog will be opened, and click [Yes].


Intel(R) I350 Gigabit Network Connection
Disabling this device will cause it to stop functioning.
Do you really want to disable it?
Yes
No

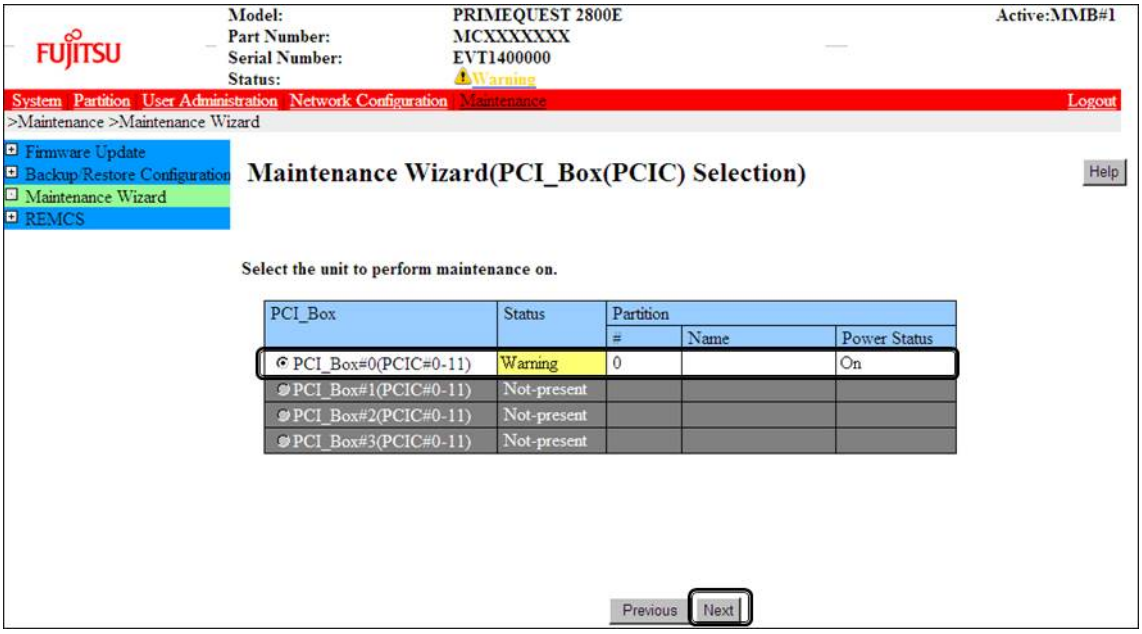
3. Stop target PCI card by using safely remove devices from computer.
   a Click Icon of Safely remove devices from computer ( ) at information zone in lower-right of desktop display.
   b Click target identified device name with step 2-a in displayed list, and disable PCI card.
4. Replace PCI card by using MMB Maintenance Wizard. [FE's work]
   This section describes the step of hot replacement of PCI cards (PCIC) using Maintenance Wizard. This work is performed by FE mainly.
   1. Open [Maintenance Wizard] menu in MMB Web-UI, and open [Maintenance Wizard].
   2. Check [Replace Unit] button, and click [Next] button.

Model: PRIMEQUEST
Part Number: MCXXXXXXX
Serial Number: EVT1600000
Status: Warning
Active:MMB#0
System Partition User Administration Network Configuration Maintenance Logout
>Maintenance >Maintenance Wizard
Firmware Update
Backup/Restore Configuration
Maintenance Wizard
REMCS
Maintenance Wizard
Help
Notice:Maintenance screen can only be used by one user at time.
Select the type of maintenance activity to perform.
Maintenance Type
Replace Unit
(Replaces a failed unit or replaces a unit to prevent failure.)
Enter Maintenance Mode
(Sets only Maintenance mode when Maintenance(excludes Replace) are performed.)
Exit Maintenance Mode
(Cancels Maintenance mode when Maintenance(excludes Replace) are finished.)
Raid Drive Maintenance Mode
(Replace failure physical drives or recover degraded logical drives.)
Next

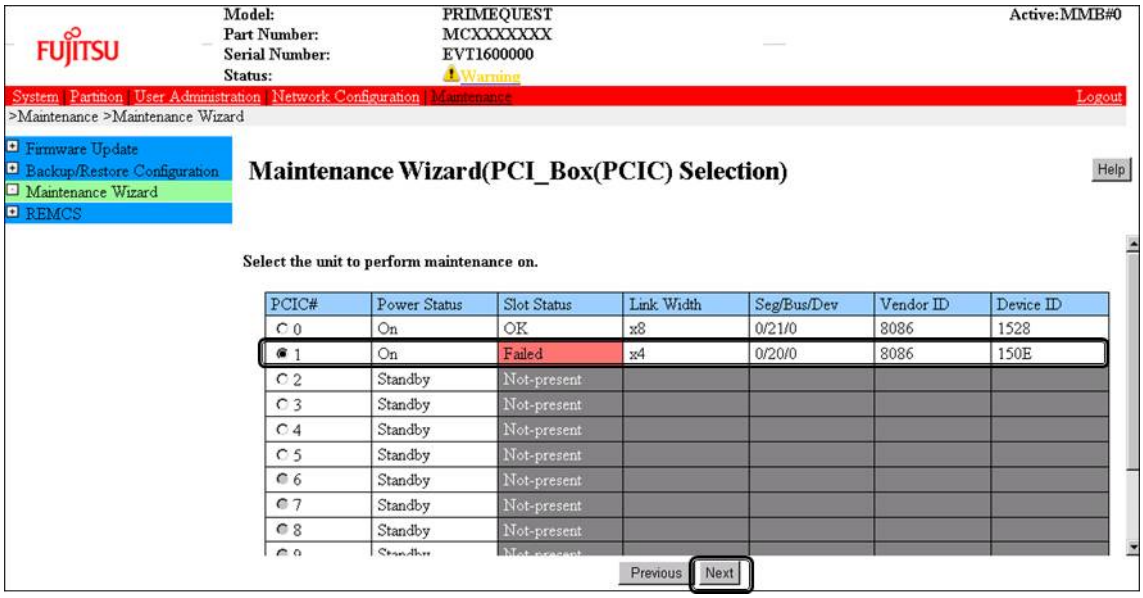
3. Check [PCI_Box(PCIC)] button, and click [Next] button.



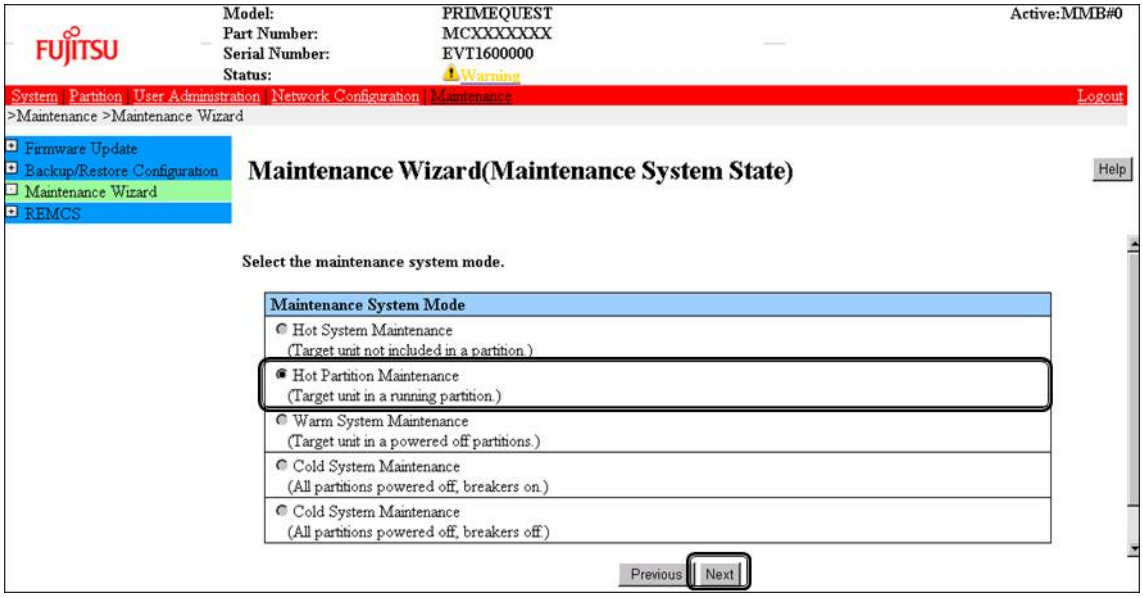
4. Check the button of the target PCI_Box number, and click [Next] button.
   For this example, it is a procedure of hot replacement of a PCI card at PCIC#1 mounted in PCI_Box#0.



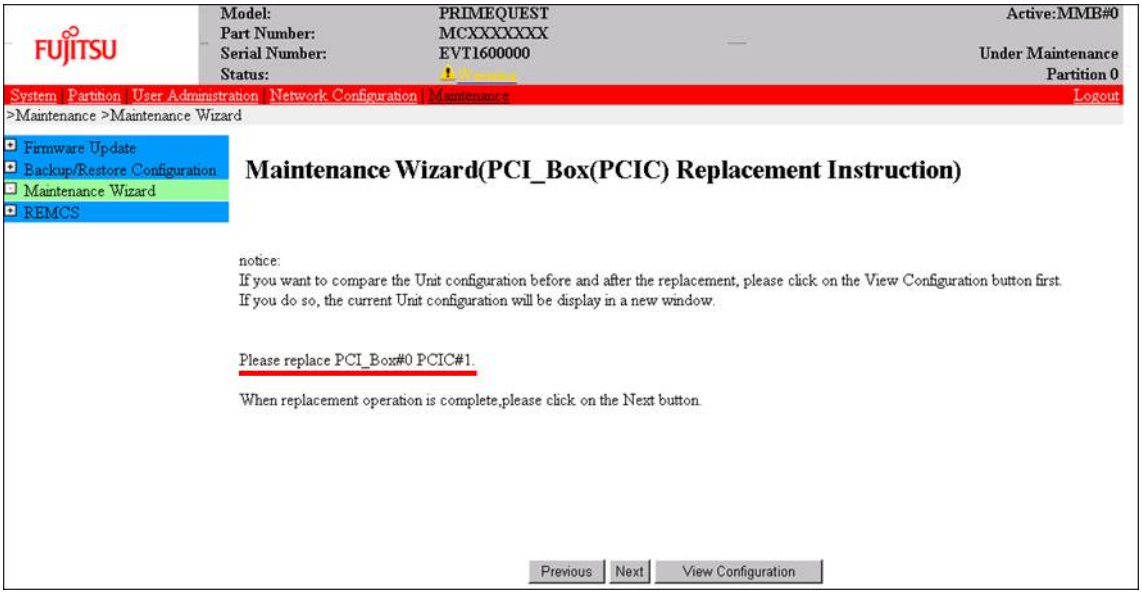
5. Check button of target PCIC number for replacing, and click [Next] button.



6. Check [Hot Partition Maintenance(Target unit in a running partition.)] button, and click [Next] button.

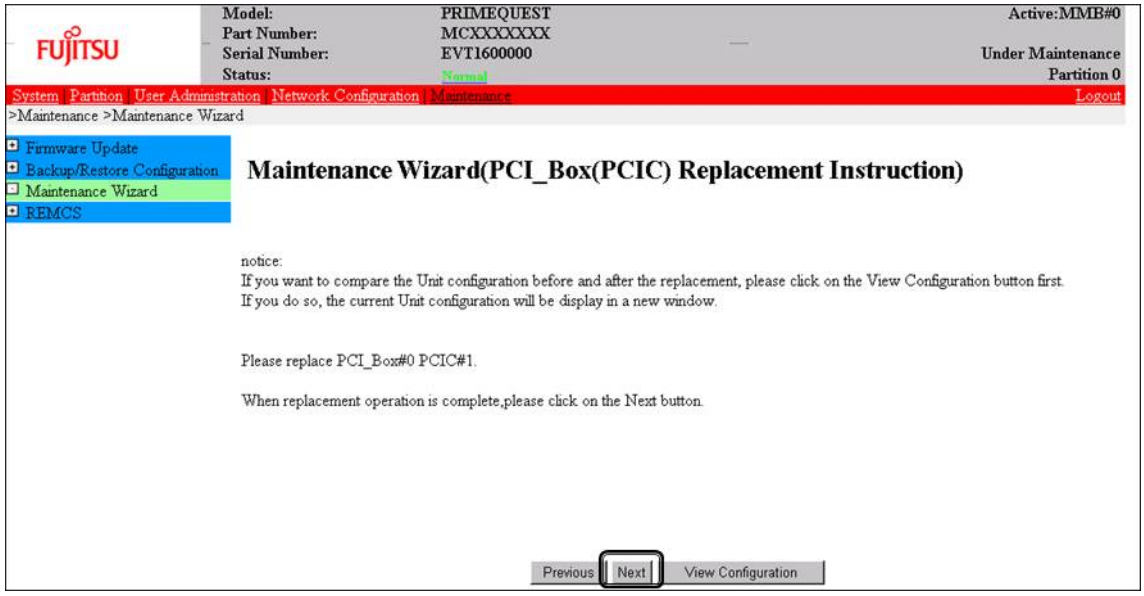


7. It will be Maintenance mode (Information zone: gray background), and instruction pages to remove target PCI card will be opened. Power off target PCIC slot and replace PCI card with opening this page. See diagrams in 'B.1 Physical Mounting Locations of Components' and 'B.2Port Numbers', and confirm physical location of PCI card which will be replaced (board and slot)
   About powering off PCIC slot, see Powering on and off PCI slots.
   About powering off PCIC slot, the system administrator will perform.


Model: PRIMEQUEST
Part Number: MCXXXXXXX
Serial Number: EVT1600000
Status: Warning
Active:MMB#0
Under Maintenance
Partition 0
System | Partition | User Administration | Network Configuration | Maintenance
Logout
>Maintenance >Maintenance Wizard
Firmware Update
Backup/Restore Configuration
Maintenance Wizard
REMCS
Maintenance Wizard(PCI_Box(PCIC) Replacement Instruction)
notice:
If you want to compare the Unit configuration before and after the replacement, please click on the View Configuration button first.
If you do so, the current Unit configuration will be display in a new window.
Please replace PCI_Box#0 PCIC#1.
When replacement operation is complete,please click on the Next button.
Previous
Next
View Configuration

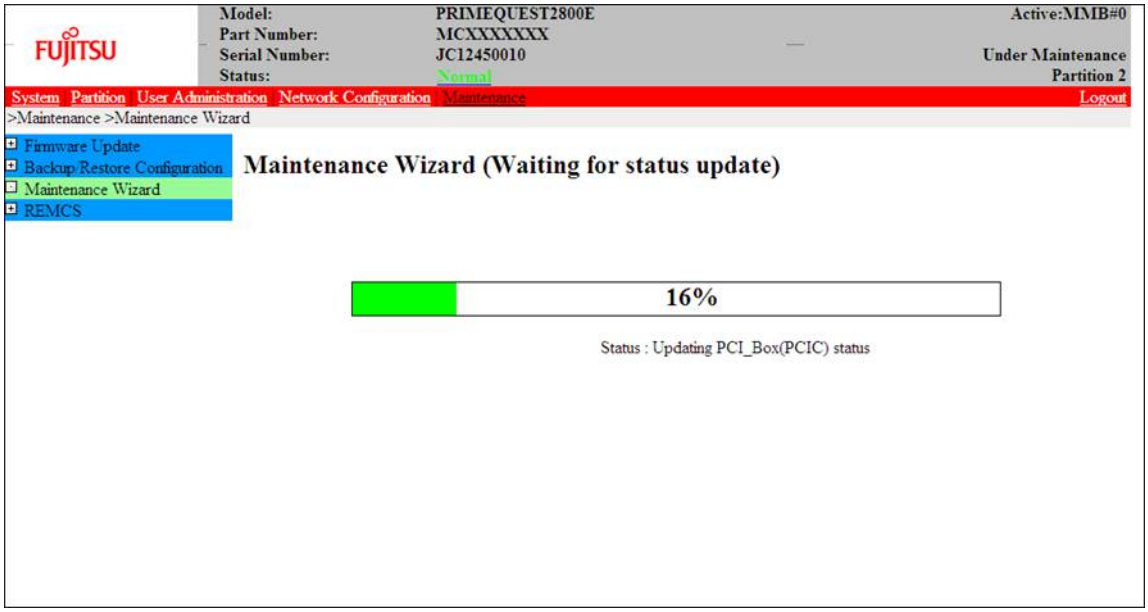
Note
Don't click [Next] Button before replacing PCI card.
About powering off PCIC slot, the system administrator must perform.

8. Replace target PCI card, power on target PCIC slot, and click [Next] button.
   About powering on PCIC slot, see Powering on and off PCI slots.
   About powering on PCIC slot, system Administrator will perform.

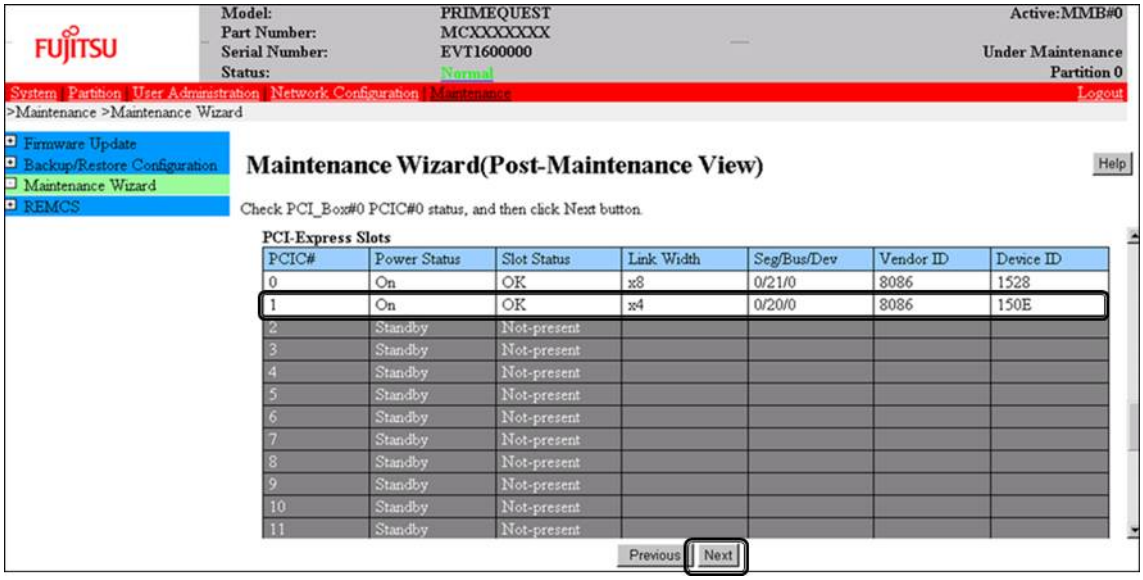

Model: PRIMEQUEST
Part Number: MCXXXXXXX
Serial Number: EVT1600000
Status: Normal
Active:MMB#0
Under Maintenance
Partition 0
System | Partition | User Administration | Network Configuration | Maintenance
Logout
>Maintenance >Maintenance Wizard
Firmware Update
Backup/Restore Configuration
Maintenance Wizard
REMCS
Maintenance Wizard(PCI_Box(PCIC) Replacement Instruction)
notice:
If you want to compare the Unit configuration before and after the replacement, please click on the View Configuration button first.
If you do so, the current Unit configuration will be display in a new window.
Please replace PCI_Box#0 PCIC#1.
When replacement operation is complete,please click on the Next button.
Previous
Next
View Configuration

Note
About powering on PCIC slot, the system administrator must perform.

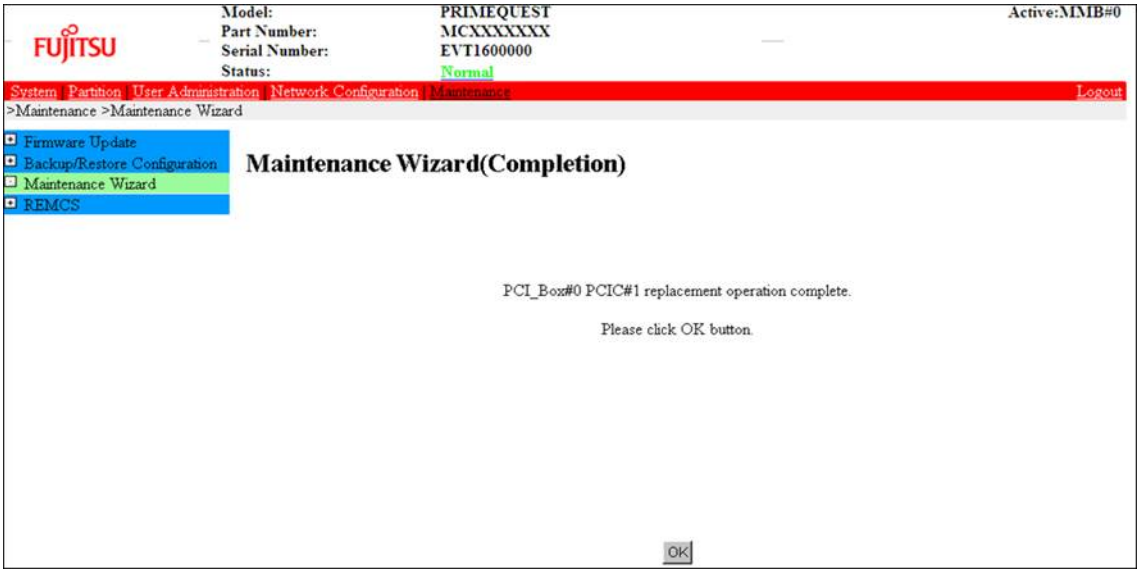
9. Status updating menu will be opened.



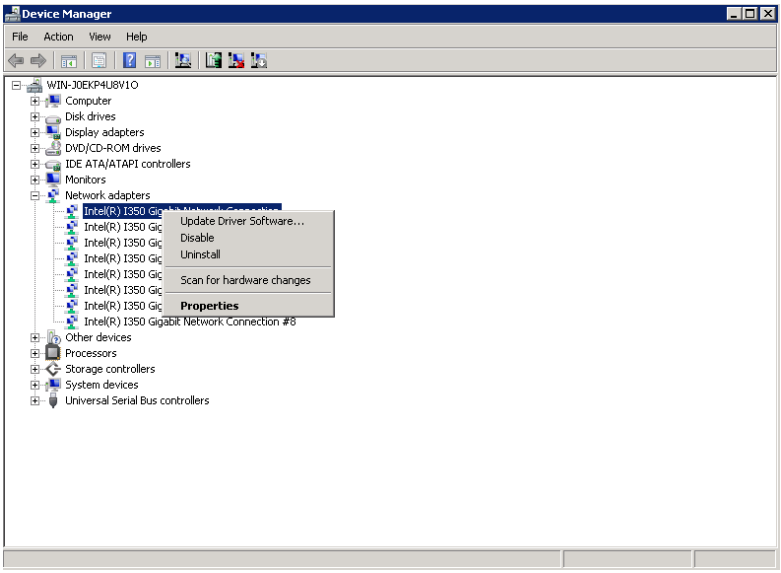
10. Confirm status of target replaced PCI card, and click [Next] button.


Model: PRIMEQUEST
Part Number: MCXXXXXXX
Serial Number: EVT1600000
Status: Normal
Active:MMB#0
Under Maintenance
Partition 0
System | Partition | User Administration | Network Configuration | Maintenance
Logout
>Maintenance >Maintenance Wizard
Firmware Update
Backup/Restore Configuration
Maintenance Wizard
REMCS
Maintenance Wizard(Post-Maintenance View)
Help
Check PCI_Box#0 PCIC#0 status, and then click Next button.
PCI-Express Slots
PCIC# | Power Status | Slot Status | Link Width | Seg/Bus/Dev | Vendor ID | Device ID
0 | On | OK | x8 | 0/21/0 | 8086 | 1528
1 | On | OK | x4 | 0/20/0 | 8086 | 150E
2 | Standby | Not-present
3 | Standby | Not-present
4 | Standby | Not-present
5 | Standby | Not-present
6 | Standby | Not-present
7 | Standby | Not-present
8 | Standby | Not-present
9 | Standby | Not-present
10 | Standby | Not-present
11 | Standby | Not-present
Previous
Next

11. Confirm Maintenance Mode is released (information zone: non-gray background), and click [OK] button.

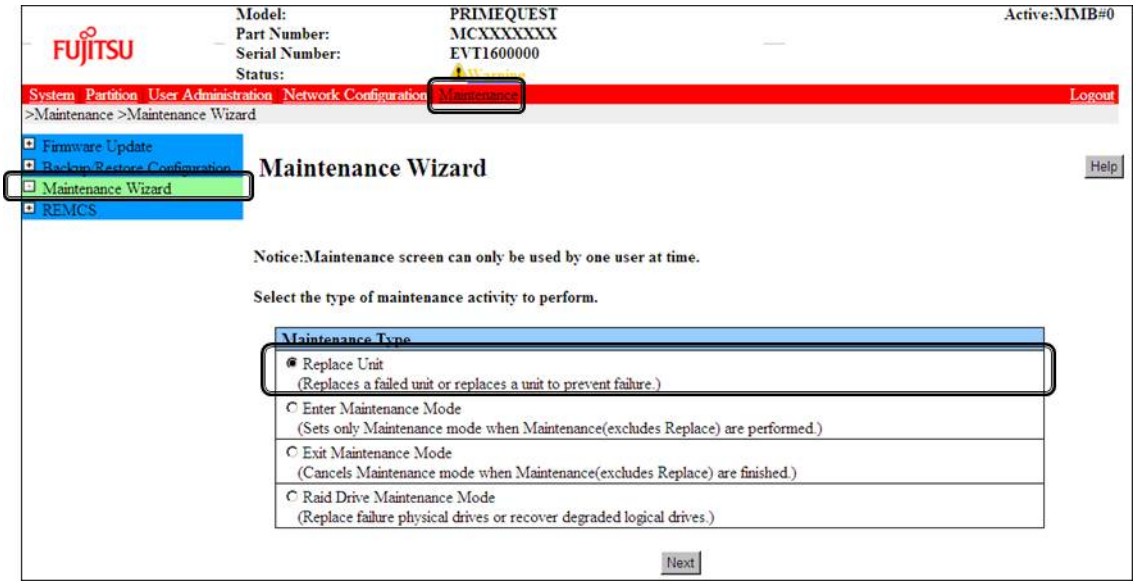


5. Confirm replaced PCI card by using Device Manager.
   After replacement of target PCI card, open Device Manager, and confirm that the target device is recognized correctly.
   Note
   As the follow, right-click target device in Device Manager, if there are [Enable] in displayed menu, check [Enable].
   (In case of [Disable], this work is not necessary)

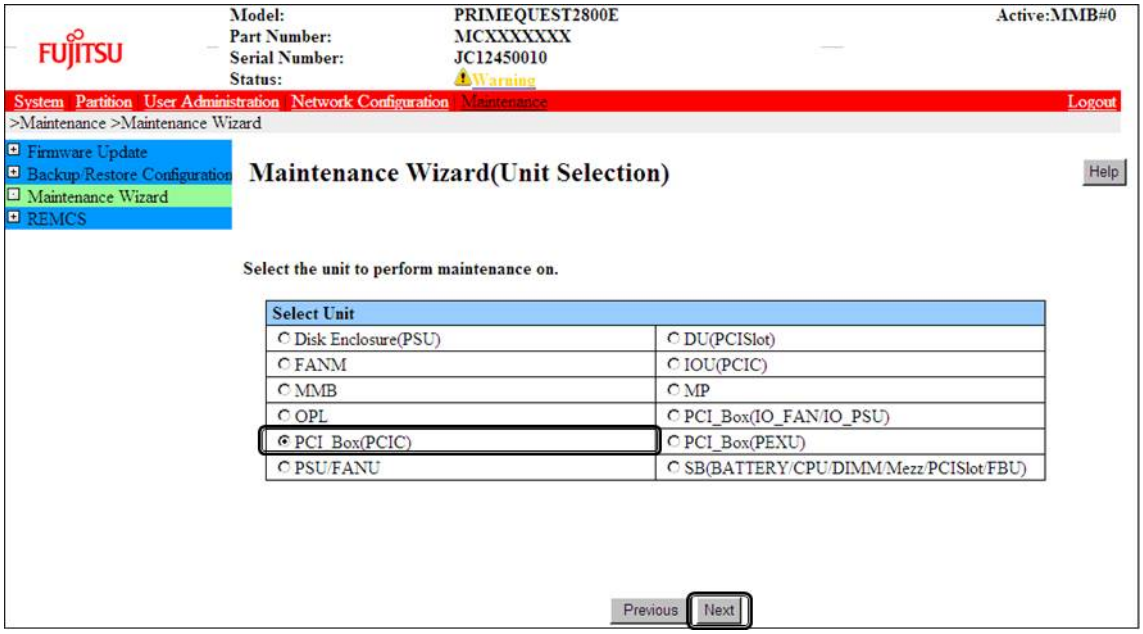


6.2.2 Addition procedure

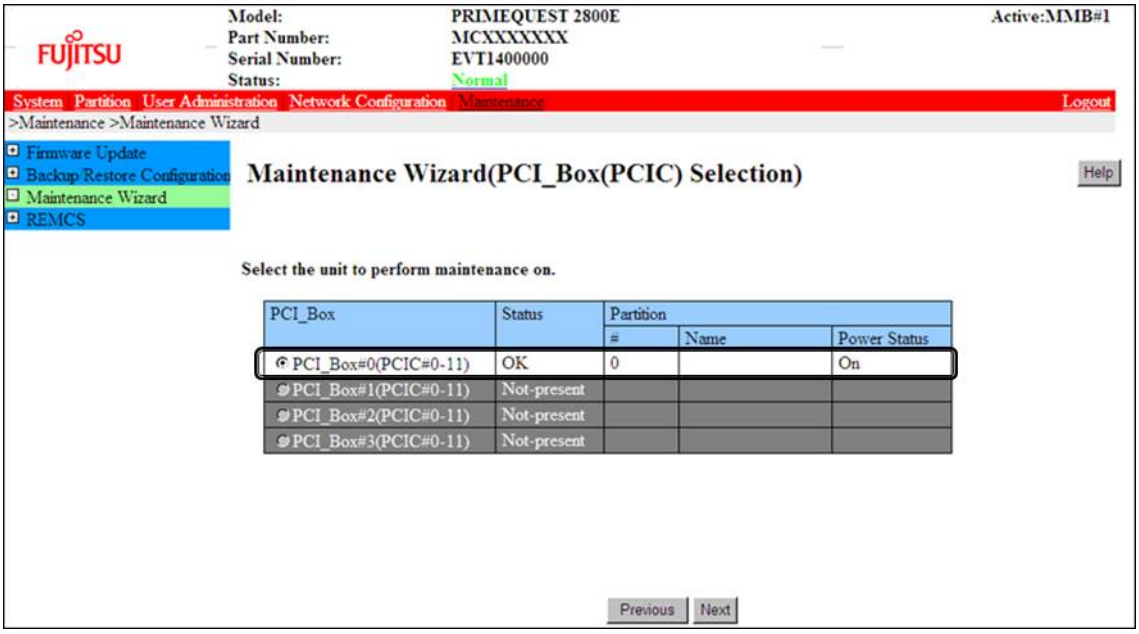
1. Confirm the physical location, segment number, and bus number.
   Confirm the mounting location of the PCI card.
   See the figure in B.1 Physical Mounting Locations of Components to check the mounting location (board and slot) of the PCI card.
2. Add PCI card by using MMB Maintenance Wizard. [FE's work]
   This section describes the procedures of hot addition of PCI cards (PCIC) using Maintenance Wizard.
   This work is performed by FE mainly.
   1. Open [Maintenance Wizard] menu in MMB Web-UI, and open [Maintenance Wizard].
   2. Check [Replace Unit] button, and click [Next] button.


Model: PRIMEQUEST
Part Number: MCXXXXXXX
Serial Number: EVT1600000
Status:
Active:MMB#0
FUJITSU
System Partition User Administration Network Configuration Maintenance Logout
>Maintenance >Maintenance Wizard
Firmware Update
Backup/Restore Configuration
Maintenance Wizard
REMCS
Maintenance Wizard
Help
Notice:Maintenance screen can only be used by one user at time.
Select the type of maintenance activity to perform.
Maintenance Type
Replace Unit
(Replaces a failed unit or replaces a unit to prevent failure.)
Enter Maintenance Mode
(Sets only Maintenance mode when Maintenance(excludes Replace) are performed.)
Exit Maintenance Mode
(Cancels Maintenance mode when Maintenance(excludes Replace) are finished.)
Raid Drive Maintenance Mode
(Replace failure physical drives or recover degraded logical drives.)
Next

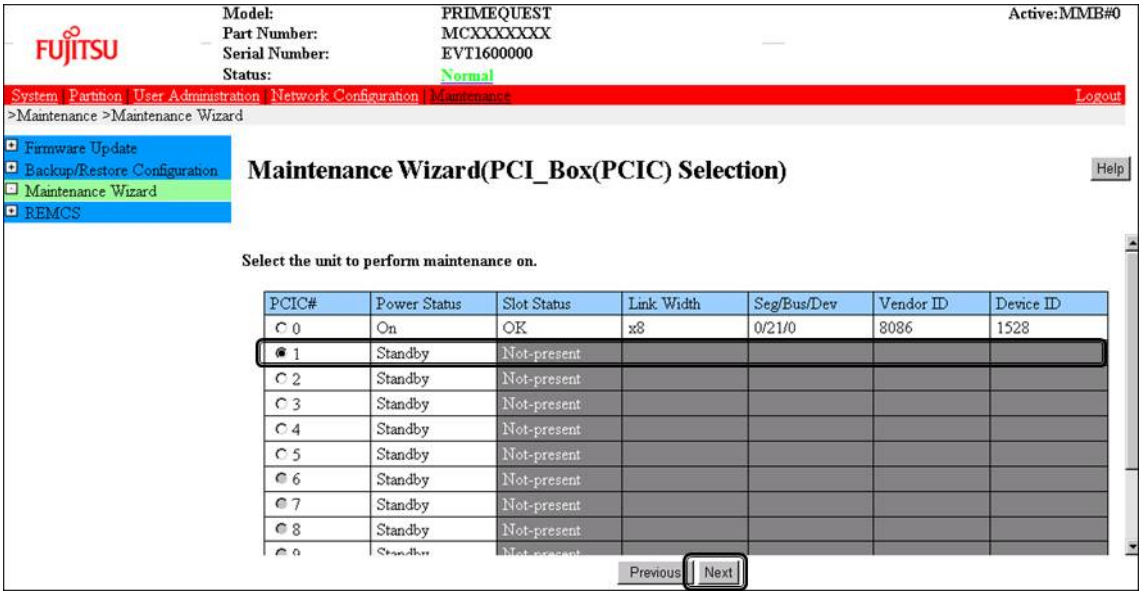
   3. Check [PCI_Box(PCIC)] button, and click [Next] button.



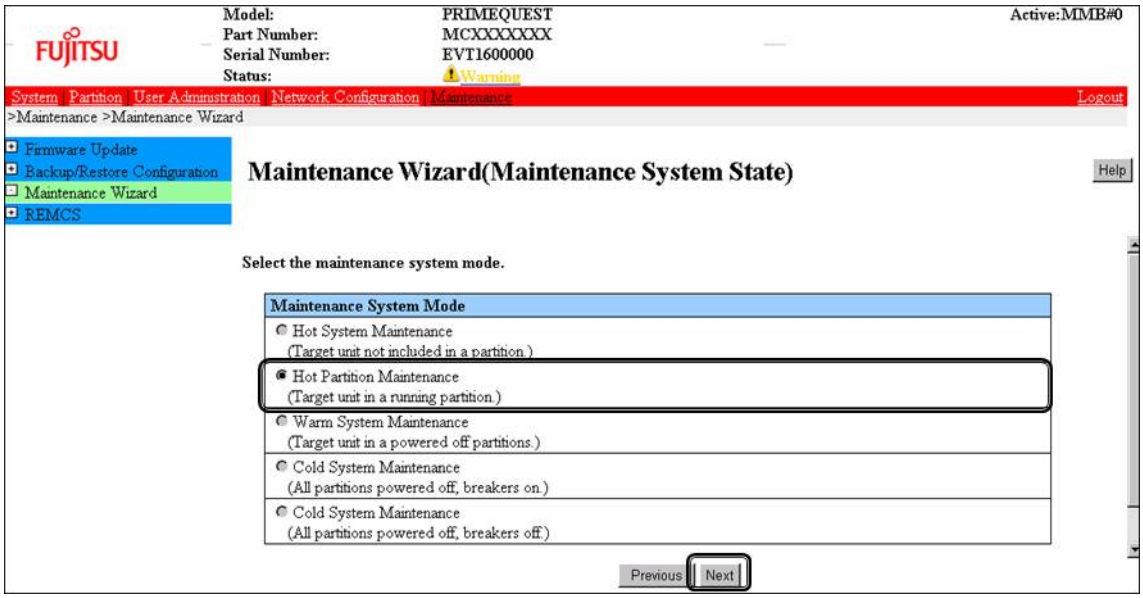
4. Check the button of the target PCI_Box number, and click [Next] button.
   For this example, it is a procedure of hot addition of a PCI card at PCIC#1 mounted in PCI_Box#0.



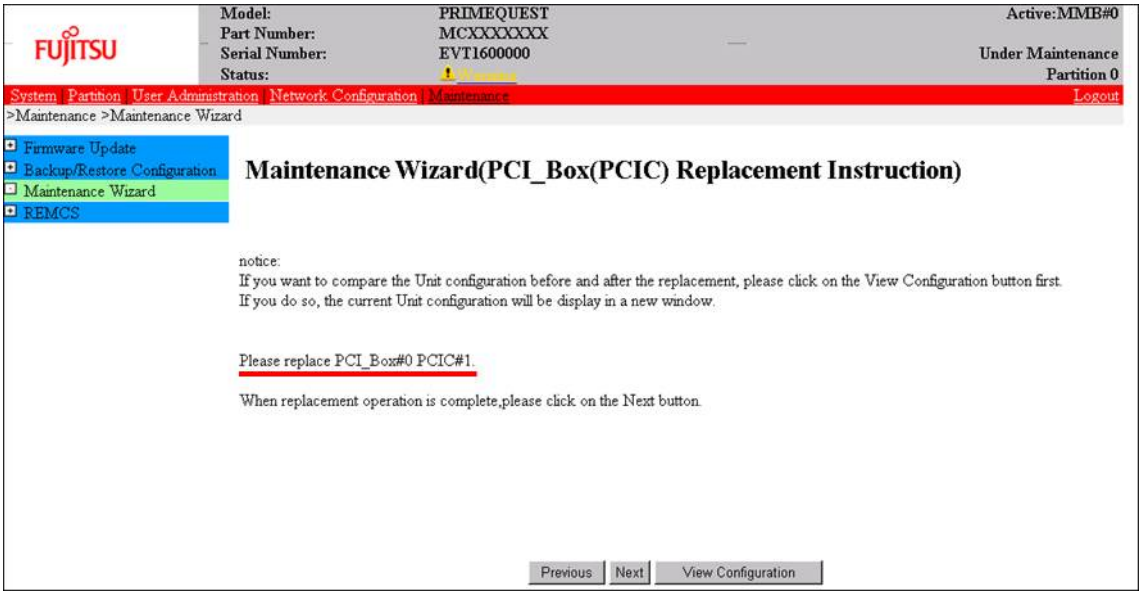
5. Check button of target PCIC number for adding, and click [Next] button.


Model: PRIMEQUEST
Part Number: MCXXXXXXX
Serial Number: EVT1600000
Status: Normal
Active:MMB#0
System | Partition | User Administration | Network Configuration | Maintenance
Logout
>Maintenance >Maintenance Wizard
Firmware Update
Backup/Restore Configuration
Maintenance Wizard
REMCS
Maintenance Wizard(PCI_Box(PCIC) Selection)
Help
Select the unit to perform maintenance on.
PCIC# | Power Status | Slot Status | Link Width | Seg/Bus/Dev | Vendor ID | Device ID
0 | On | OK | x8 | 0/21/0 | 8086 | 1528
1 | Standby | Not-present
2 | Standby | Not-present
3 | Standby | Not-present
4 | Standby | Not-present
5 | Standby | Not-present
6 | Standby | Not-present
7 | Standby | Not-present
8 | Standby | Not-present
Previous
Next

6. Check [Hot Partition Maintenance (Target unit in a running partition.)] button, and click [Next] button.

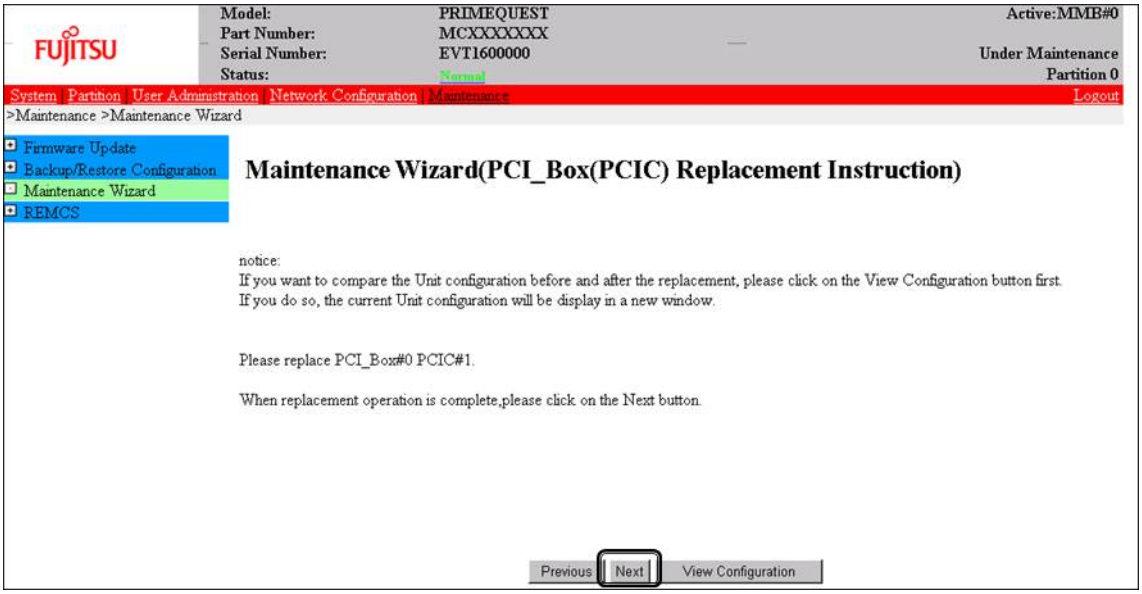


7. It will be Maintenance mode (Information zone: gray background), and instruction pages to add target PCI card will be opened. Power off target PCIC slot and add PCI card with opening this page. See diagrams in B.1 Physical Mounting Locations of Components and B.2 Port Numbers, and confirm physical location of PCI card which will be added. (board and slot)
   About powering off PCIC slot, see Powering on and off PCI slots.
   About powering off PCIC slot, the system administrator will perform.


Model: PRIMEQUEST
Part Number: MCXXXXXXX
Serial Number: EVT1600000
Status:
Active:MMB#0
Under Maintenance
Partition 0
System | Partition | User Administration | Network Configuration | Maintenance
Logout
>Maintenance >Maintenance Wizard
Firmware Update
Backup/Restore Configuration
Maintenance Wizard
REMCS
Maintenance Wizard(PCI_Box(PCIC) Replacement Instruction)
notice:
If you want to compare the Unit configuration before and after the replacement, please click on the View Configuration button first.
If you do so, the current Unit configuration will be display in a new window.
Please replace PCI_Box#0 PCIC#1.
When replacement operation is complete,please click on the Next button.
Previous
Next
View Configuration

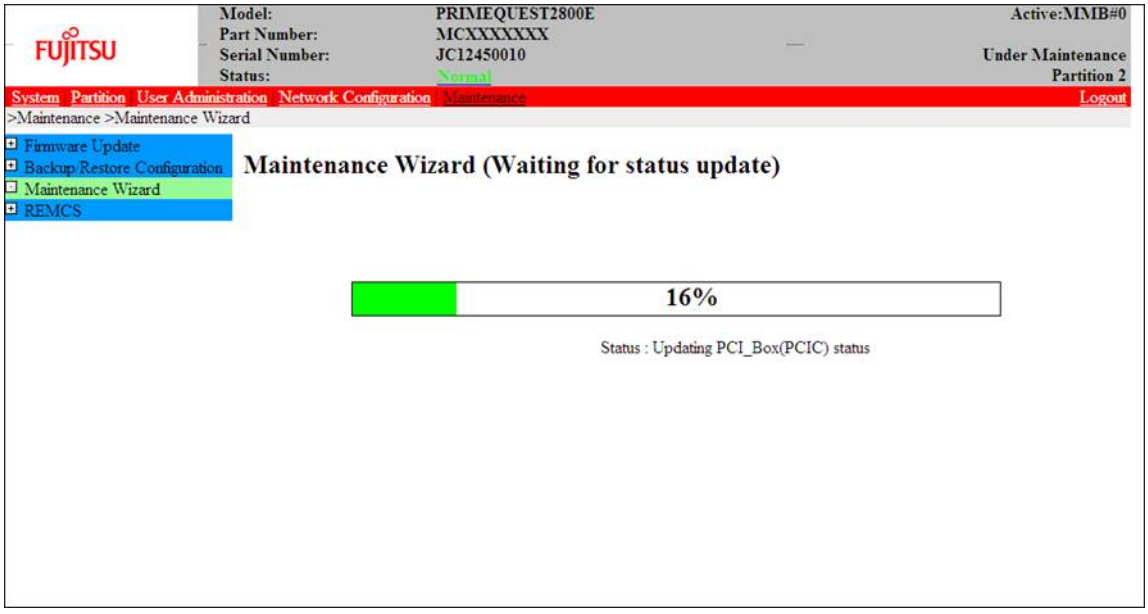
Note
Don't click [Next] Button before adding PCI card.
About powering off PCIC slot, the system administrator must perform.

8. Add target PCI card, power on target PCIC slot, and click [Next] button.
   About powering on PCIC slot, see Powering on and off PCI slots.
   About powering on PCIC slot, the system administrator will perform.

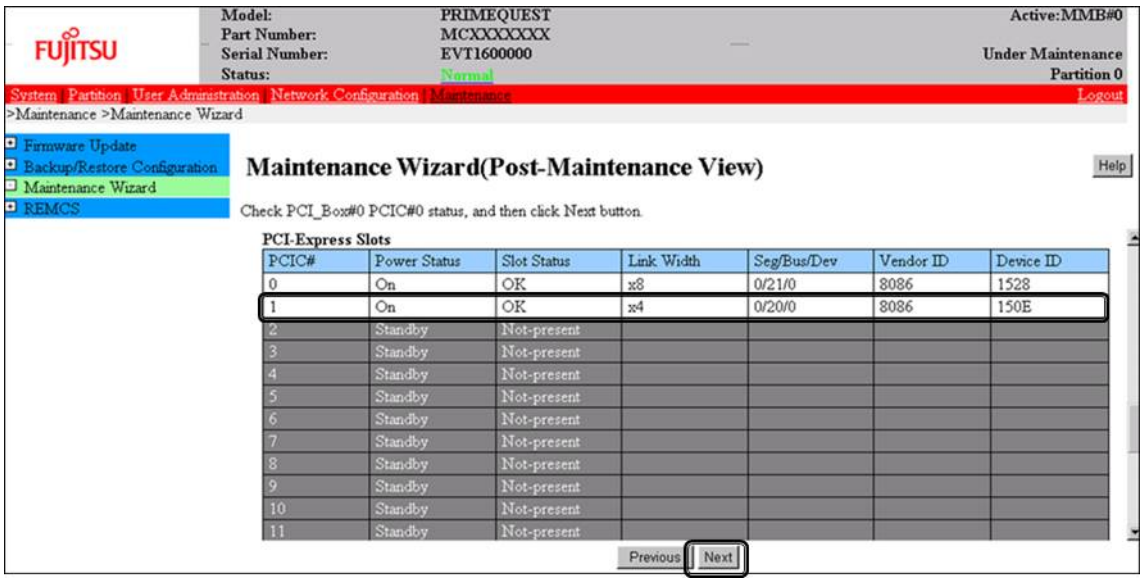

Model: PRIMEQUEST
Part Number: MCXXXXXXX
Serial Number: EVT1600000
Status: Normal
Active:MMB#0
Under Maintenance
Partition 0
System | Partition | User Administration | Network Configuration | Maintenance
Logout
>Maintenance >Maintenance Wizard
Firmware Update
Backup/Restore Configuration
Maintenance Wizard
REMCS
Maintenance Wizard(PCI_Box(PCIC) Replacement Instruction)
notice:
If you want to compare the Unit configuration before and after the replacement, please click on the View Configuration button first.
If you do so, the current Unit configuration will be display in a new window.
Please replace PCI_Box#0 PCIC#1.
When replacement operation is complete,please click on the Next button.
Previous
Next
View Configuration

Note
About powering on PCIC slot, system Administrator must perform.

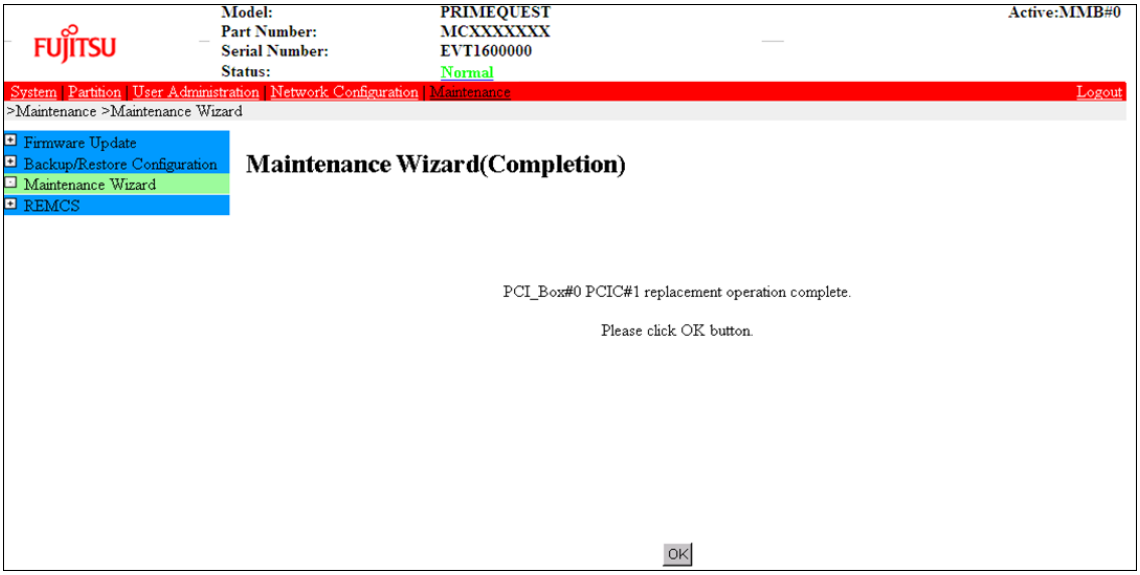
9. Status updating menu will be opened.



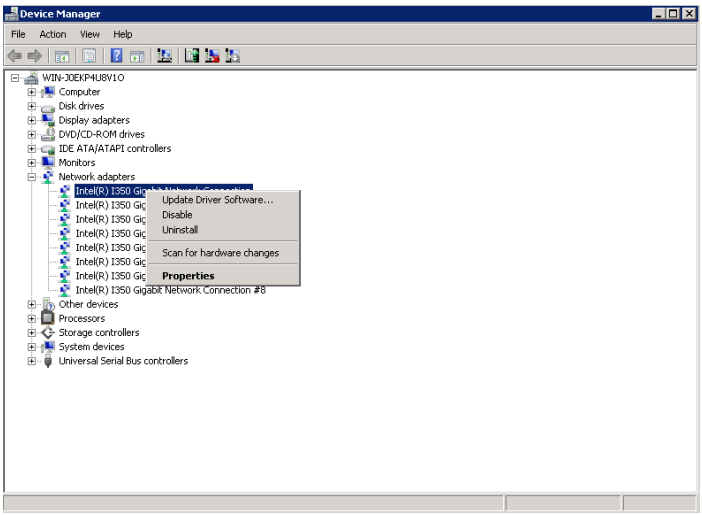
10. Confirm status of target added PCI card, and click [Next] button.


Model: PRIMEQUEST
Part Number: MCXXXXXXX
Serial Number: EVT1600000
Status: Normal
Active:MMB#0
Under Maintenance
Partition 0
System | Partition | User Administration | Network Configuration | Maintenance
Logout
>Maintenance >Maintenance Wizard
Firmware Update
Backup/Restore Configuration
Maintenance Wizard
REMCS
Maintenance Wizard(Post-Maintenance View)
Help
Check PCI_Box#0 PCIC#0 status, and then click Next button.
PCI-Express Slots
PCIC# | Power Status | Slot Status | Link Width | Seg/Bus/Dev | Vendor ID | Device ID
0 | On | OK | x8 | 0/21/0 | 8086 | 1528
1 | On | OK | x4 | 0/20/0 | 8086 | 150E
2 | Standby | Not-present
3 | Standby | Not-present
4 | Standby | Not-present
5 | Standby | Not-present
6 | Standby | Not-present
7 | Standby | Not-present
8 | Standby | Not-present
9 | Standby | Not-present
10 | Standby | Not-present
11 | Standby | Not-present
Previous
Next

11. Confirm Maintenance Mode is released. (information zone: non-gray background), and click [OK] button.



3. Confirm replaced PCI card by using Device Manager.
   After replacement of target PCI card, open Device Manager, and confirm that the target device is recognized correctly.
   Note
   As the follow, right-click target device in Device Manager, if there are [Enable] in displayed menu, check [Enable].
   (In case of [Disable], this work is not necessary)



6.2.3 About removal

Note
Windows does not support PCI card removal.

6.3 NIC Hot Plugging

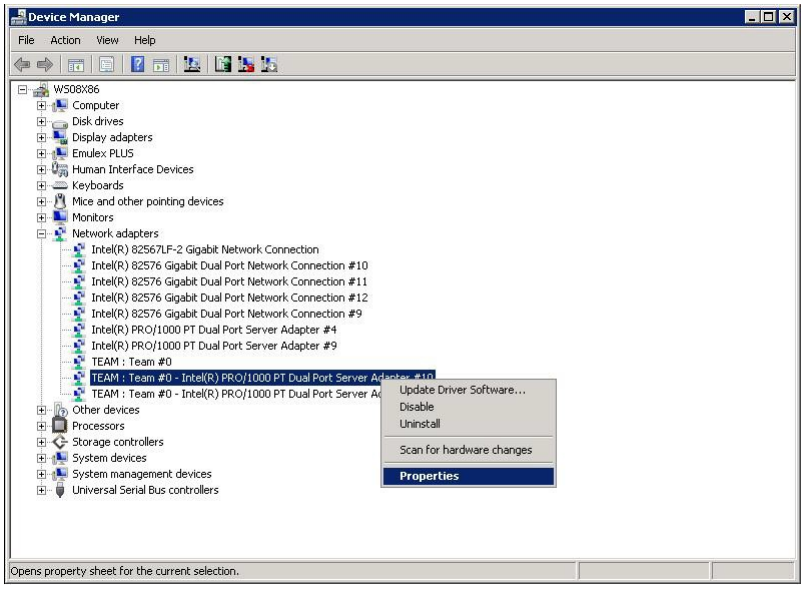
For NIC hot plugging (replacement), you need to especially consider other matters in addition to the procedure described in '6.2 Common Hot Plugging Procedure for PCI Express cards'.
This section describes NIC hot plugging combined with teaming.

6.3.1 Hot plugging a NIC incorporated into teaming

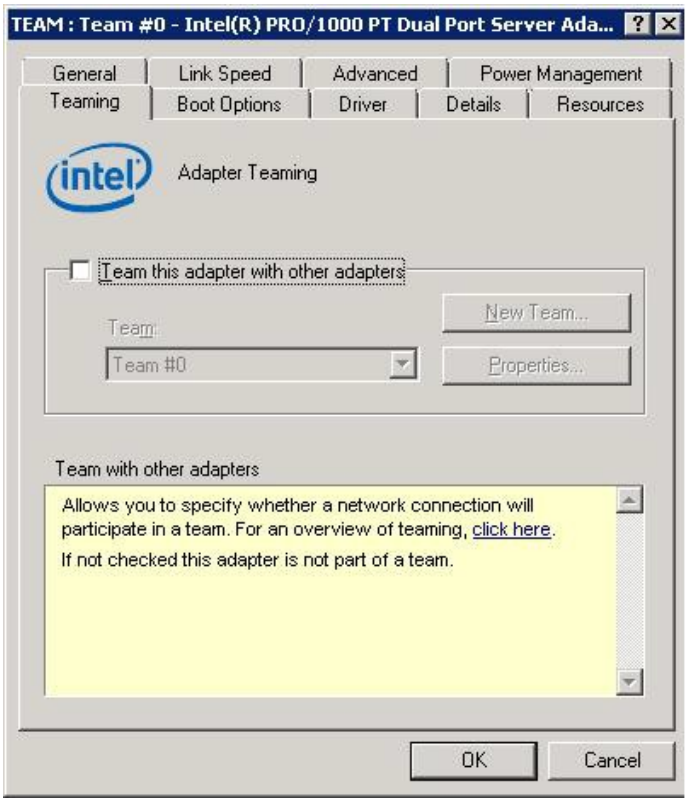
This section describes the hot plugging procedure for a NIC incorporated into teaming.
Note

- Be sure to perform hot plugging after removing the card. If the card is not removed, the operating system may stop.
- There are some precautions on teaming with Intel PROSet(R). For details on the precautions, see 'G.8 NIC (Network Interface Card)'.

1. Confirm physical location, segment number and bus number of NIC to be replaced.
   Confirm the physical location, segment number and bus number with step 1 at '6.2.1 Replacement procedure' in '6.2 Common Hot Plugging Procedure for PCI Express cards'.
   Note
   In case of multi-function card, there are some cards that have same segment number, same bus number, and different function numbers.
   In this case, please perform Step.2 to Step.7 of follows respectively.
2. Confirm target NIC in Device Manager.
   Confirm NIC with step 2-a at '6.2.1 Replacement procedure' in '6.2 Common Hot Plugging Procedure for PCI Express cards'.
3. Select the interface in Device Manager, and open Properties.

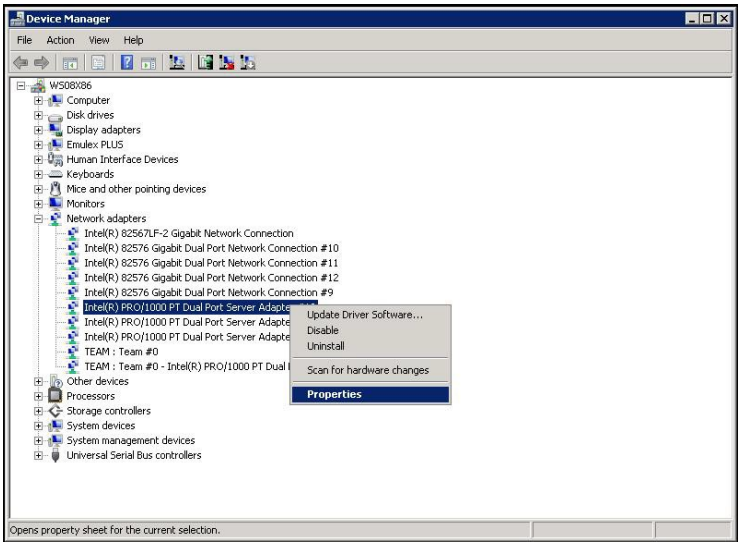


4. Click the [Teaming] tab, uncheck the [Team this adapter with other adapters] check box, and click the [OK] button.

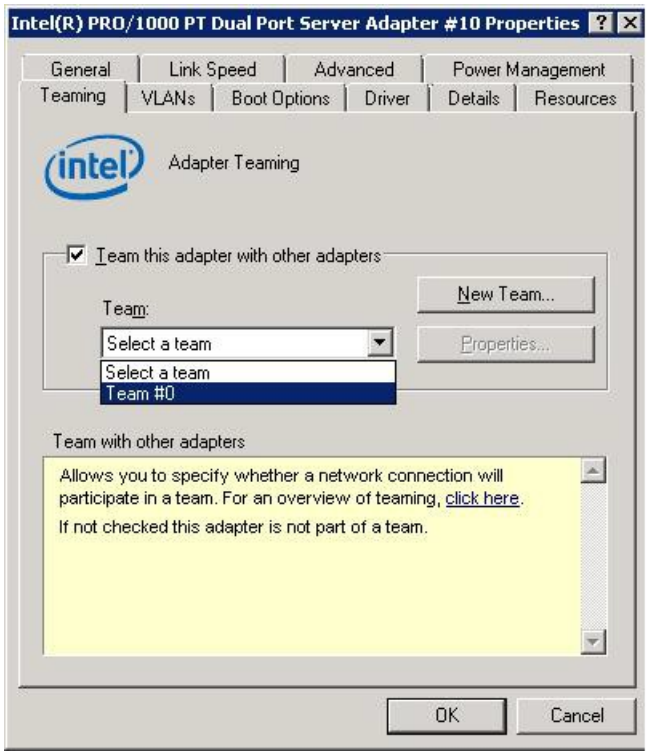


5. The following message appears. Click the [Yes] button.

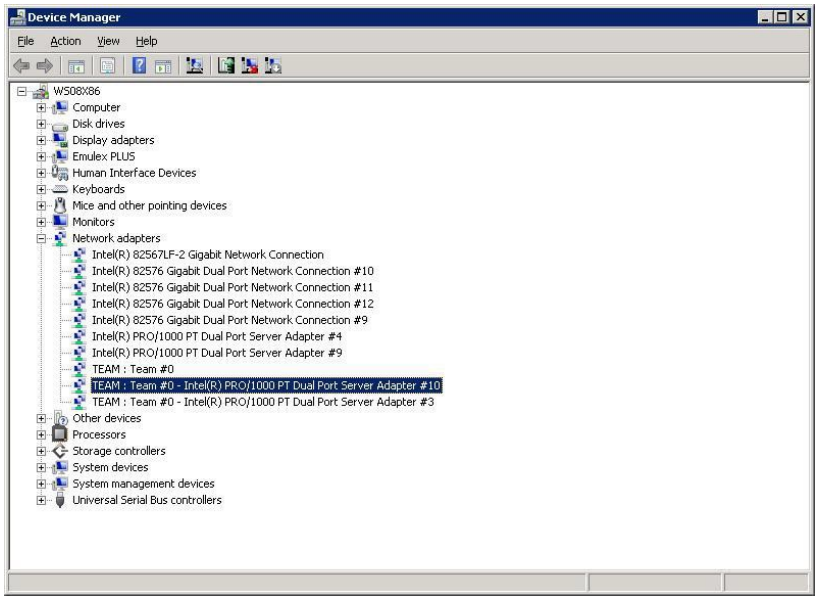
6. Disable target NIC in Device manager.
   Disable NIC with step 2-b at '6.2.1 Replacement procedure' in '6.2 Common Hot Plugging Procedure for PCI Express cards'.
7. Stop target NIC by using safely remove devices from computer.
   Stop NIC with step 3 at '6.2.1 Replacement procedure' in '6.2 Common Hot Plugging Procedure for PCI Express cards'.
8. Replace NIC by using MMB Maintenance Wizard. [FE's work]
   Replace NIC with step 4 at '6.2.1 Replacement procedure' in '6.2 Common Hot Plugging Procedure for PCI Express cards'.
9. Confirm the replaced card by using Device Manager.
   After replacement, open Device Manager, and confirm that the target device is recognized correctly.
10. After completing the replacement, open the Device Manager and open the properties dialog box of the NIC to be incorporated into teaming.



11. On the [Teaming] tab, check [Team this adapter with other adapters], select the team into which the adapter was incorporated before the replacement, and click the [OK] button.



12. In the Device Manager, confirm that the NIC is incorporated into the team.


Device Manager
File Action View Help
WS08X86
Computer
Disk drives
Display adapters
Emulex PLUS
Human Interface Devices
Keyboards
Mice and other pointing devices
Monitors
Network adapters
Intel(R) 82567LF-2 Gigabit Network Connection
Intel(R) 82576 Gigabit Dual Port Network Connection #10
Intel(R) 82576 Gigabit Dual Port Network Connection #11
Intel(R) 82576 Gigabit Dual Port Network Connection #12
Intel(R) 82576 Gigabit Dual Port Network Connection #9
Intel(R) PRO/1000 PT Dual Port Server Adapter #4
Intel(R) PRO/1000 PT Dual Port Server Adapter #9
TEAM : Team #0
TEAM : Team #0 - Intel(R) PRO/1000 PT Dual Port Server Adapter #10
TEAM : Team #0 - Intel(R) PRO/1000 PT Dual Port Server Adapter #3
Other devices
Processors
Storage controllers
System devices
System management devices
Universal Serial Bus controllers

Note
As the follow, right-click target device in Device Manager, if there are [Enable] in displayed menu, check [Enable].
(In case of [Disable], this work is not necessary)

6.3.2 Hot plugging a non-redundant NIC

This section describes the hot plugging procedure in networks without redundancy (a NIC is not incorporated into teaming).
Replace NIC with '6.2.1 Replacement procedure' in '6.2 Common Hot Plugging Procedure for PCI Express cards'.

6.3.3 NIC addition procedure

Referring to '6.2 Common Hot Plugging Procedure for PCI Express cards', add a NIC.

6.4 FC Card Hot Plugging

For FC card hot plugging (replacement), you need to especially consider other matters in addition to the procedure described in '6.2 Common Hot Plugging Procedure for PCI Express cards'.
The hot plugging of an FC card changes the WWN of the FC card if the WWN is set on an FC switch or RAID device (ETERNUS). For details on how to set the WWN again for a new card, see the respective device manuals. This section describes hot plugging of an FC card combined with ETERNUS MPD (multipath driver).
It is required that the firmware version of new FC card is same as that of the FC card which had been replaced. If the firmware version of new FC card is coincident with that of the FC card which had been replaced (current firmware version), it is not necessary to update the firmware version of new FC card to current firmware version.
If the firmware version of new FC card is not coincident with that of the FC card which had been replaced (current firmware version), update the firmware version of new FC card to current firmware version.
For how to update the firmware version, see firmware update manual for fibre channel card.
Notes

- FC cards at PCI Segment Mode are not valid.
- SAN boot paths are not valid.
- LTO library devices are not supported.
- Depending on the Windows specifications, if the FC card connection destination has a Page File or other such paging scheme, FC card hot plugging may not be supported.

- In case of using SVagent, “Source:SVagent, ID: 25004 Error massage” is logged in SEL when replacing, it is no problem.

6.4.1 Hot plugging an FC card incorporated with the ETERNUS multipath driver

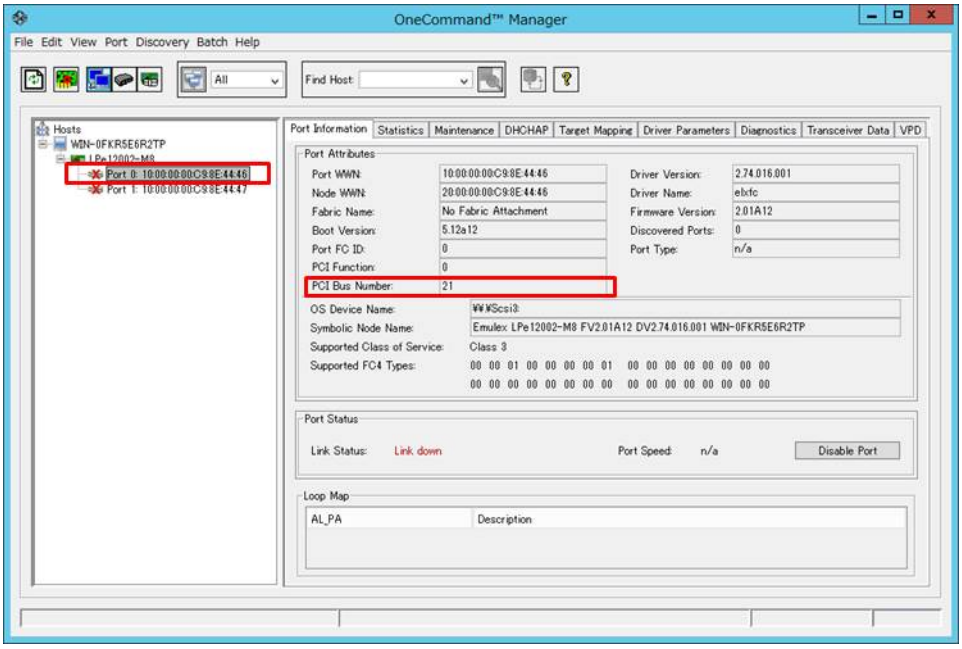
This section describes the hot plugging procedure for an FC card incorporated with the ETERNUS multipath driver.

1. Confirm physical location, segment number and bus number of target NIC.
   Confirm the physical location, segment number and bus number with step 1 at ‘6.2.1 Replacement procedure’ in ‘6.2 Common Hot Plugging Procedure for PCI Express cards’.
   Note
   In case of multi-function card, there are some cards that have same segment number, same bus number, and different function numbers.
   In this case, please perform Step.2 to Step.6 of follows respectively.

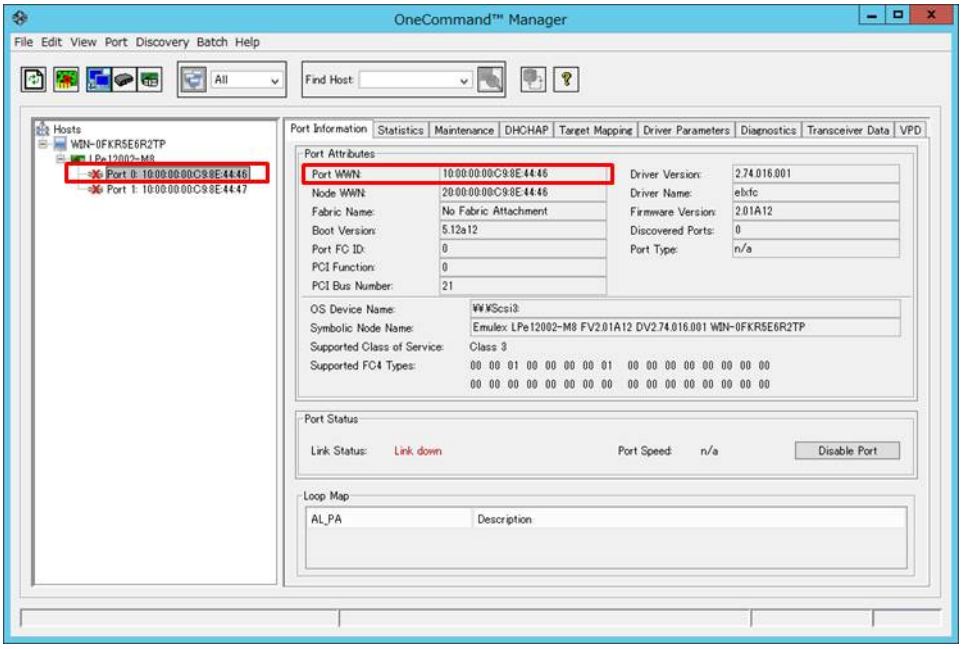
2. Confirm target device by using administration manager of the FC card, and confirm WWN, port number, and firmware version.

   Case: Emulex FC card

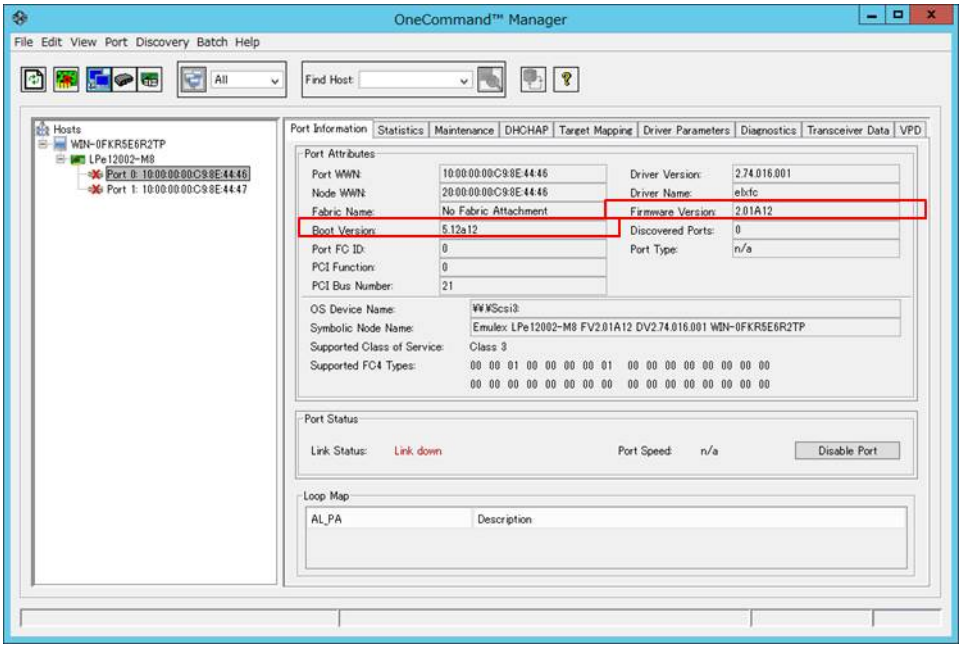
   a Open OneCommand Manager, confirm target device with step 2.
   Select Port WWN as the same type of target FC card in left pane, and select [Port Information] tab in right pane.
   See “PCI Bus Number” in [Port Attributes], and look for the device which has same bus number you confirmed in step 1.



   b See WWN and port number of target device.
   Select Port WWN of target FC card in left pane, and select [port Information] tab in right pane. WWN is written at “Port WWN” in [Port Attributes].



c Confirm firmware version of target device.
Select the device name of target FC card in left pane, and see [Port Information] in right pane.

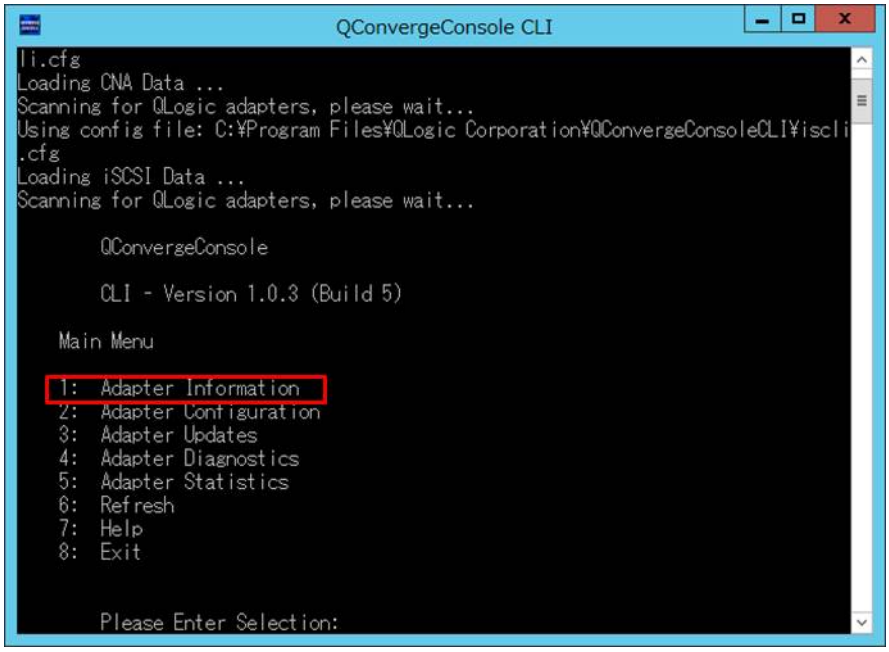


d Close OneCommand Manager.

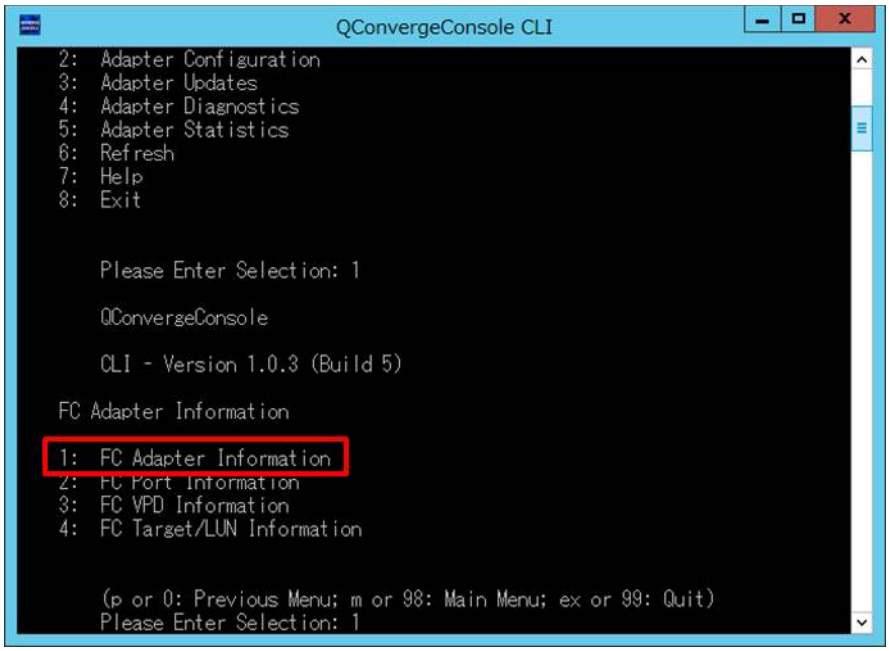
Case: Qlogic FC card

a Open QConverge Console CLI, and identify target device from the bus number in step 2.

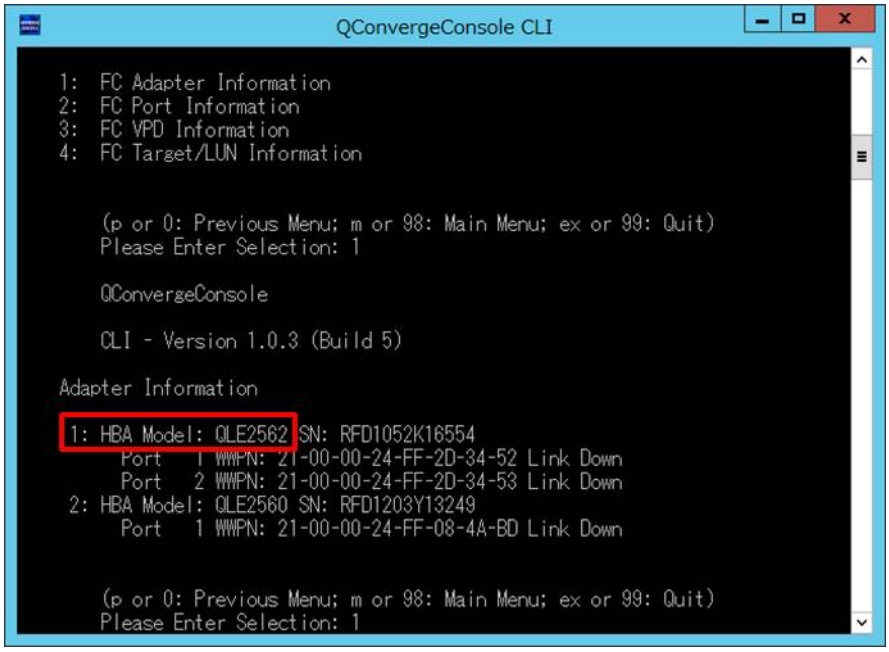
1. Select “1: Adapter Information” in [Main Menu].



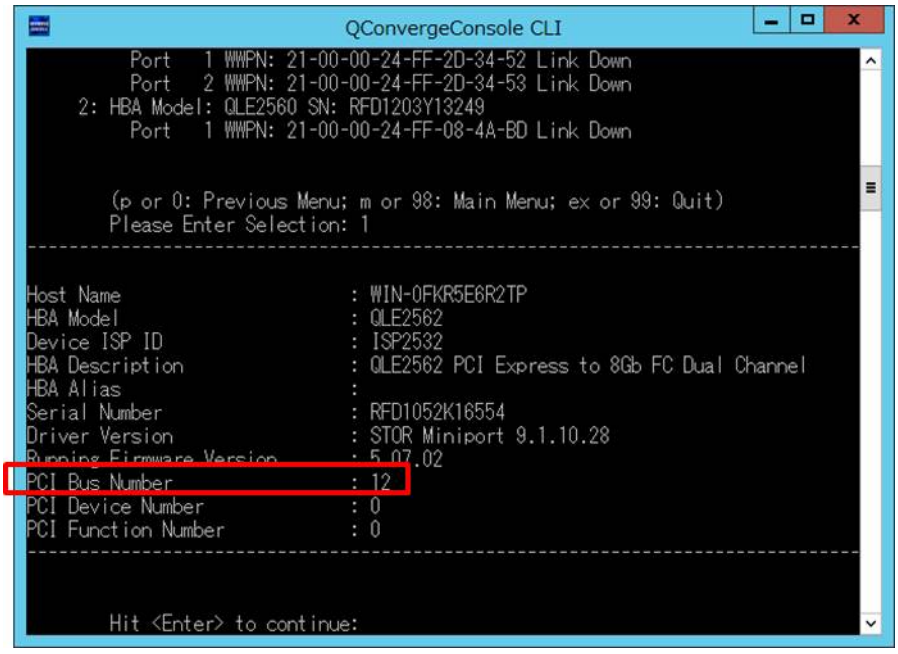
2. Select “e1: FC Adapter Information” in [FC Adapter Information].



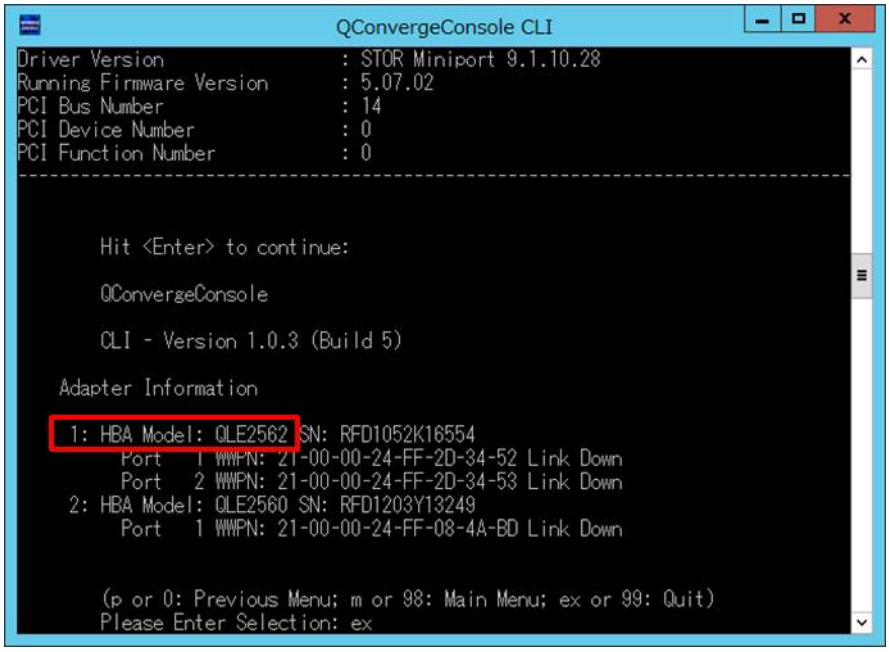
3. Select the device of the same type of target FC card in [Adapter Information].


QConvergeConsole CLI
1: FC Adapter Information
2: FC Port Information
3: FC VPD Information
4: FC Target/LUN Information
(p or 0: Previous Menu; m or 98: Main Menu; ex or 99: Quit)
Please Enter Selection: 1
QConvergeConsole
CLI - Version 1.0.3 (Build 5)
Adapter Information
1: HBA Model: QLE2562 SN: RFD1052K16554
Port 1 WWPN: 21-00-00-24-FF-2D-34-52 Link Down
Port 2 WWPN: 21-00-00-24-FF-2D-34-53 Link Down
2: HBA Model: QLE2560 SN: RFD1203Y13249
Port 1 WWPN: 21-00-00-24-FF-08-4A-BD Link Down
(p or 0: Previous Menu; m or 98: Main Menu; ex or 99: Quit)
Please Enter Selection: 1

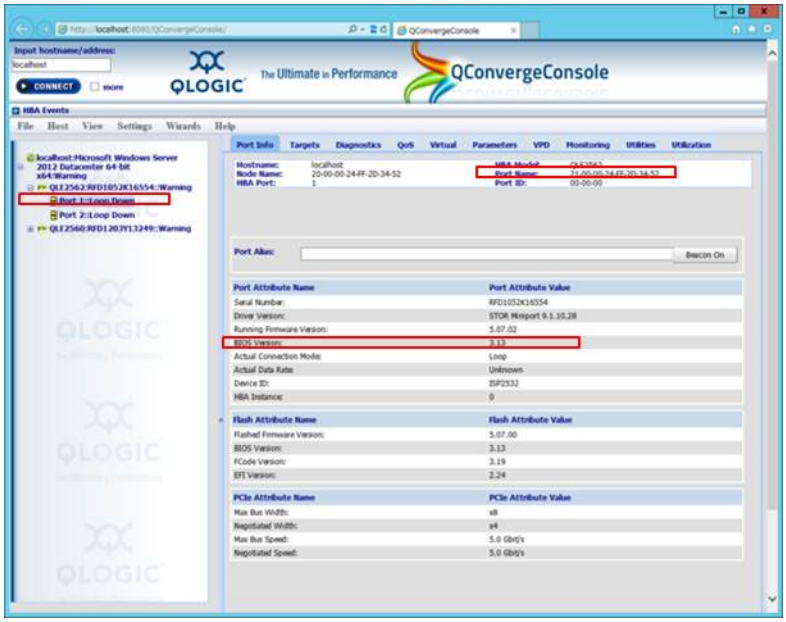
4. Confirm “PCI Bus Number” of PCI card, and look for the device which has same bus number you confirmed in step 1.


QConvergeConsole CLI
Port 1 WWPN: 21-00-00-24-FF-2D-34-52 Link Down
Port 2 WWPN: 21-00-00-24-FF-2D-34-53 Link Down
2: HBA Model: QLE2560 SN: RFD1203Y13249
Port 1 WWPN: 21-00-00-24-FF-08-4A-BD Link Down
(p or 0: Previous Menu; m or 98: Main Menu; ex or 99: Quit)
Please Enter Selection: 1
Host Name : WIN-0FKR5E6R2TP
HBA Model : QLE2562
Device ISP ID : ISP2532
HBA Description : QLE2562 PCI Express to 8Gb FC Dual Channel
HBA Alias :
Serial Number : RFD1052K16554
Driver Version : STOR Miniport 9.1.10.28
Running Firmware Version : 5.07.02
PCI Bus Number : 12
PCI Device Number : 0
PCI Function Number : 0
Hit <Enter> to continue:

b Confirm WWN and port number of target device.
WWN is the information described as “WWPN:” of target FC card in [Adapter Information].

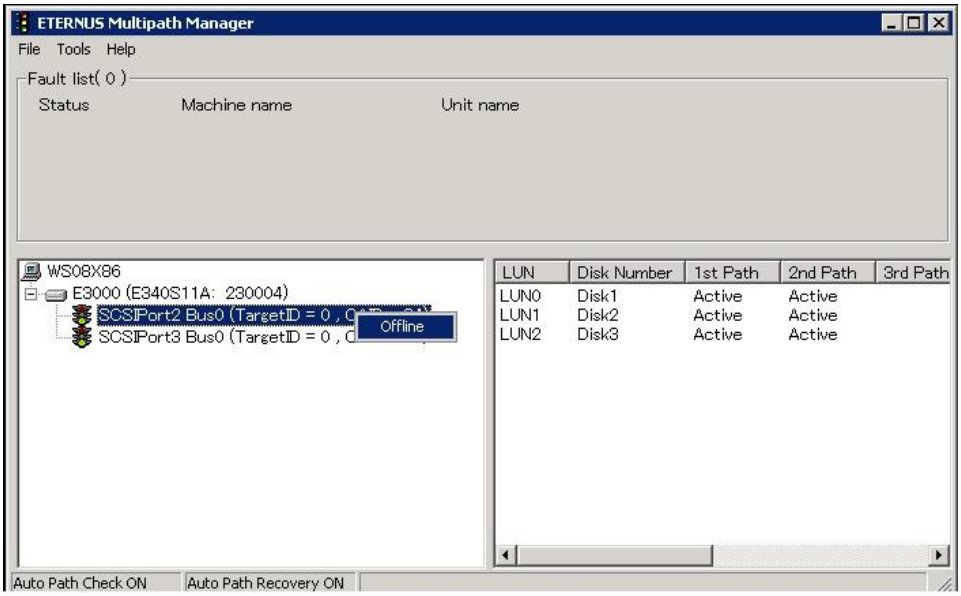

QConvergeConsole CLI
Driver Version : STOR Miniport 9.1.10.28
Running Firmware Version : 5.07.02
PCI Bus Number : 14
PCI Device Number : 0
PCI Function Number : 0
Hit <Enter> to continue:
QConvergeConsole
CLI - Version 1.0.3 (Build 5)
Adapter Information
1: HBA Model: QLE2562 SN: RFD1052K16554
Port 1 WWPN: 21-00-00-24-FF-2D-34-52 Link Down
Port 2 WWPN: 21-00-00-24-FF-2D-34-53 Link Down
2: HBA Model: QLE2560 SN: RFD1203Y13249
Port 1 WWPN: 21-00-00-24-FF-08-4A-BD Link Down
(p or 0: Previous Menu; m or 98: Main Menu; ex or 99: Quit)
Please Enter Selection: ex

c Confirm firmware version of target device.
QConverge Console GUI, and select device name of target FC card in left pane, and see [Port Info].
The firmware version is the information described as “BIOS Version:” in [Port Attribute Name].

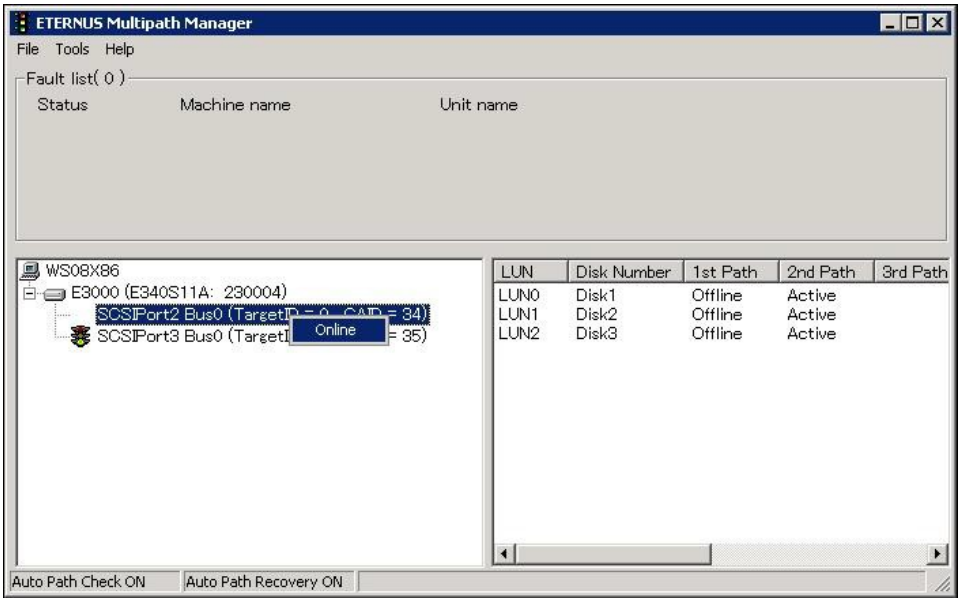


d Close QConverge Console CLI/GUI.

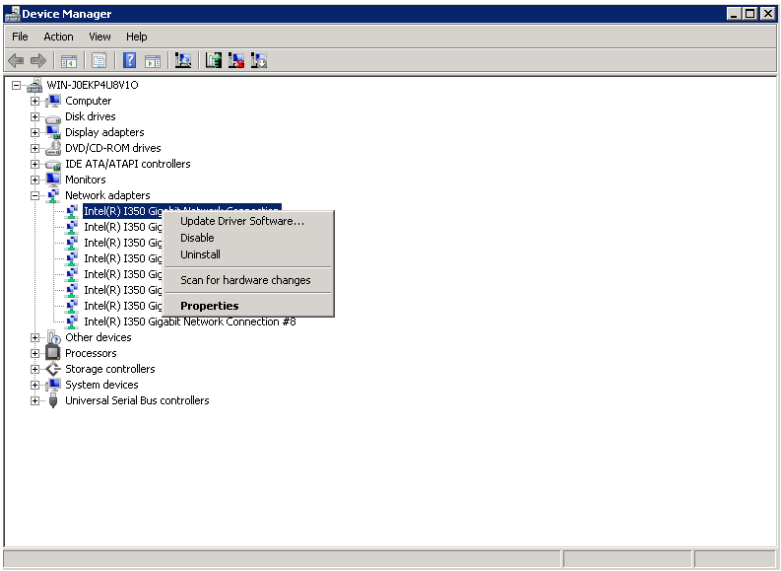
3. Open ETERNUS Multipath Manager and place all the devices to be replaced offline.



4. Confirm target FC card by using Device Manager.
   Confirm FC card with step 2-a at '6.2.1 Replacement procedure' in '6.2 Common Hot Plugging Procedure for PCI Express cards'.
5. Disable target FC card by using Device Manager.
   Disable FC card with step 2-a at '6.2.1 Replacement procedure' in '6.2 Common Hot Plugging Procedure for PCI Express cards'.
6. Stop target FC card by using safely remove device from computer.
   Stop FC card with step 2-a at '6.2.1 Replacement procedure' in '6.2 Common Hot Plugging Procedure for PCI Express cards'.
7. Replace FC card by using MMB Maintenance Wizard. [FE's work]
   Replace FC card with step 2-a at '6.2.1 Replacement procedure' in '6.2 Common Hot Plugging Procedure for PCI Express cards'.
8. Confirm firmware version of replaced FC card.
   It is required that the firmware version of new FC card is same as that of the FC card which had been replaced. If the firmware version of new FC card is coincident with that of the FC card which had been replaced (current firmware version), it is not necessary to update the firmware version of new FC card to current firmware version.
   If the firmware version of new FC card is not coincident with that of the FC card which had been replaced (current firmware version), update the firmware version of new FC card to current firmware version.
   For how to update the firmware version, see firmware update manual for fibre channel card.
   Note
   If you cannot confirm the firmware version of the FC card before replacing due to the fault of the FC card, check the firmware version of the FC card which is same type as the faulty one to update firmware version.
9. Start ETERNUS Multipath Manager and place all the replaced devices online. Confirm that the devices are normally incorporated with the multipath driver.



10. Confirm replaced FC card by using Device Manager.
    Open Device Manager, and confirm that the target device is recognized correctly.
    Note
    As the follow, right-click target device in Device Manager, if there are [Enable] in displayed menu, check [Enable].
    (In case of [Disable], this work is not necessary)



6.4.2 FC card addition procedure

Referring to 6.2 Common Hot Plugging Procedure for PCI Express cards, add an FC card.

6.5 Hot Replacement Procedure for iSCSI

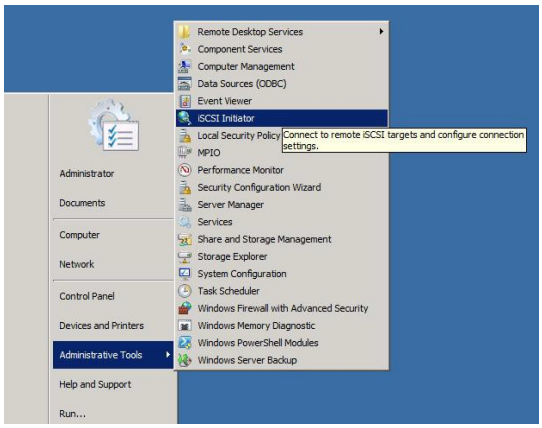
The prerequisites for iSCSI (NIC) hot replacement are as follows.

- The maintenance person has the Administrator privileges required for operations.
- The ETERNUS multipath driver (MPD) has been applied.
- To replace more than one card, one card at a time will be replaced.

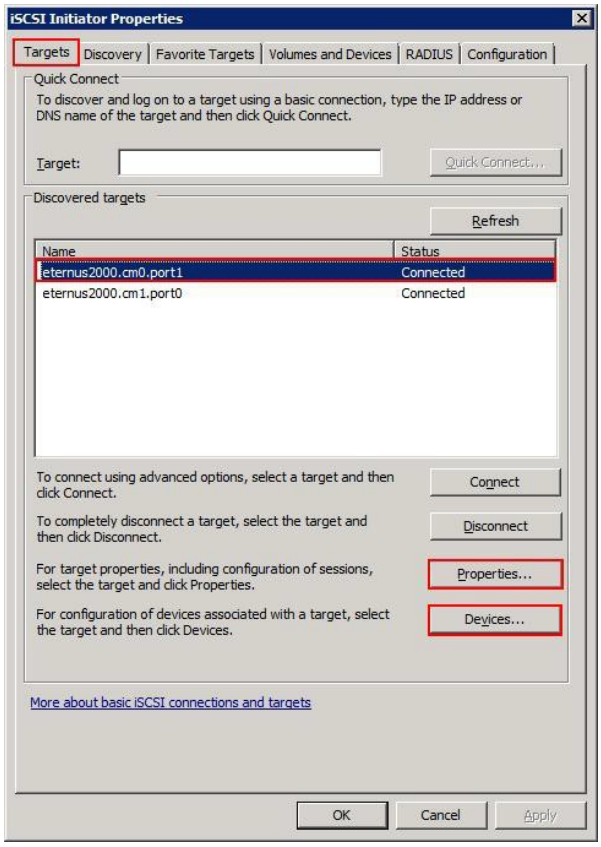
6.5.1 Confirming the incorporation of a card with MPD

This section describes the procedure for confirming that a card has been incorporated with MPD.

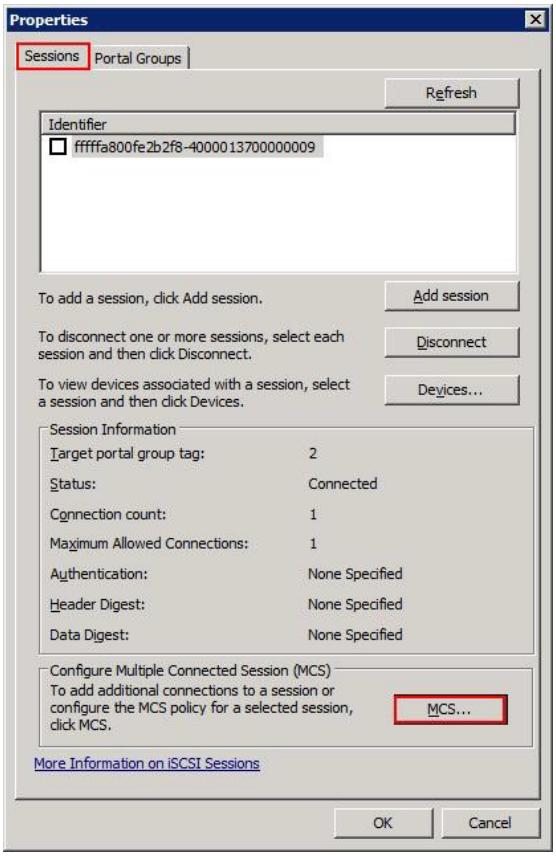
1. Confirm physical location, segment number and bus number of target NIC.
   Confirm the physical location, segment number and bus number with step 1 at 6.2.1 Replacement procedure in 6.2 Common Hot Plugging Procedure for PCI Express cards.
   Note
   In case of multi-function card, there are some cards that have same segment number, same bus number, and different function numbers.
   In this case, please perform Step.2 to Step.7 of follows respectively.
2. Confirm target NIC in Device Manager.
   Confirm NIC with step 2-a at 6.2.1 Replacement procedure in 6.2 Common Hot Plugging Procedure for PCI Express cards.
3. Record IP address of target replaced NIC.
   Open Command Prompt, command “ipconfig/all”, and record information that is necessary to reconfigure IP address, subnet mask and so on of NIC after replacement.
4. Open iSCSI initiator.



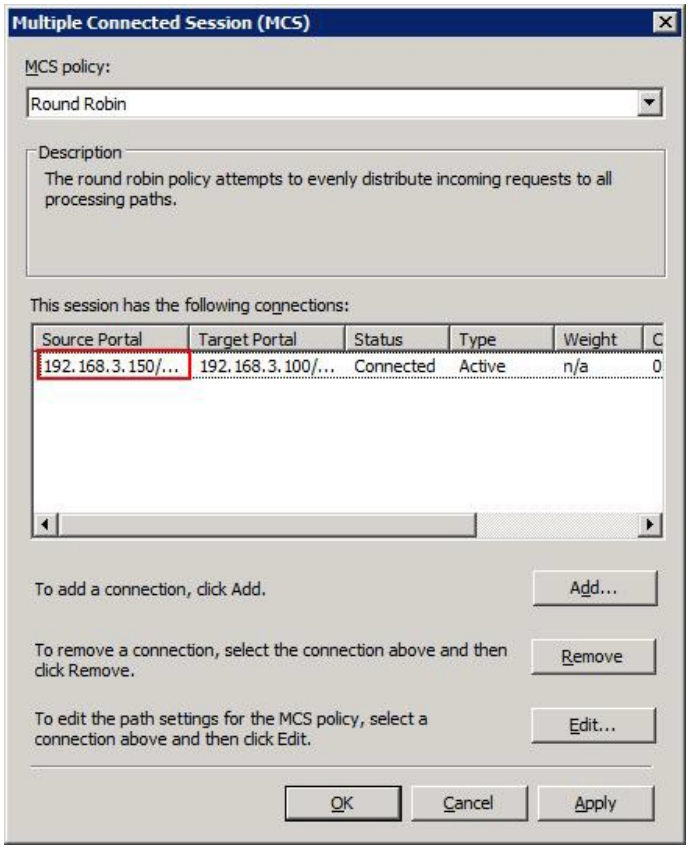
5. Click the [Targets] tab in the [iSCSI Initiator Properties] window. One of the targets displayed in [Discovered targets] is connected to the NIC to be replaced. If you know which target, select the target, click the [Devices] button, and proceed to step 10.
   If you do not know, select any target, click the [Properties] button, and proceed to step 7.



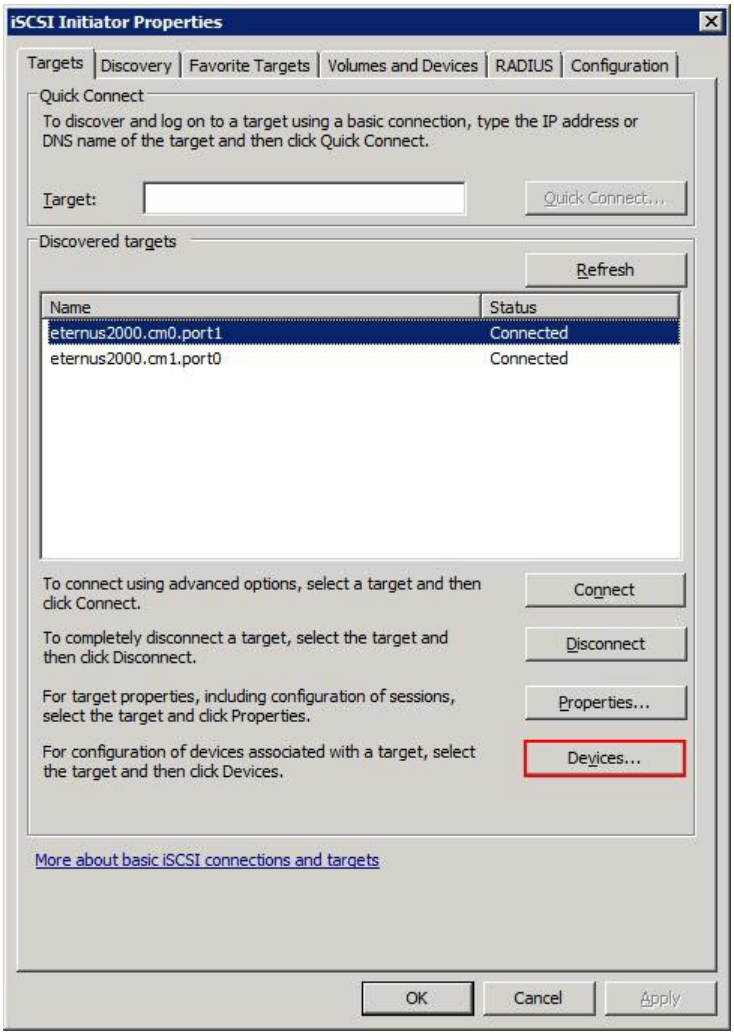
6. Click the [Sessions] tab in the [Properties] window, and click the [MCS] button.


Properties
Sessions
Portal Groups
Refresh
Identifier
ffffffa800fe2b2f8-4000013700000009
To add a session, click Add session.
Add session
To disconnect one or more sessions, select each session and then click Disconnect.
Disconnect
To view devices associated with a session, select a session and then click Devices.
Devices...
Session Information
Target portal group tag: 2
Status: Connected
Connection count: 1
Maximum Allowed Connections: 1
Authentication: None Specified
Header Digest: None Specified
Data Digest: None Specified
Configure Multiple Connected Session (MCS)
To add additional connections to a session or configure the MCS policy for a selected session, click MCS.
MCS...
More Information on iSCSI Sessions
OK
Cancel

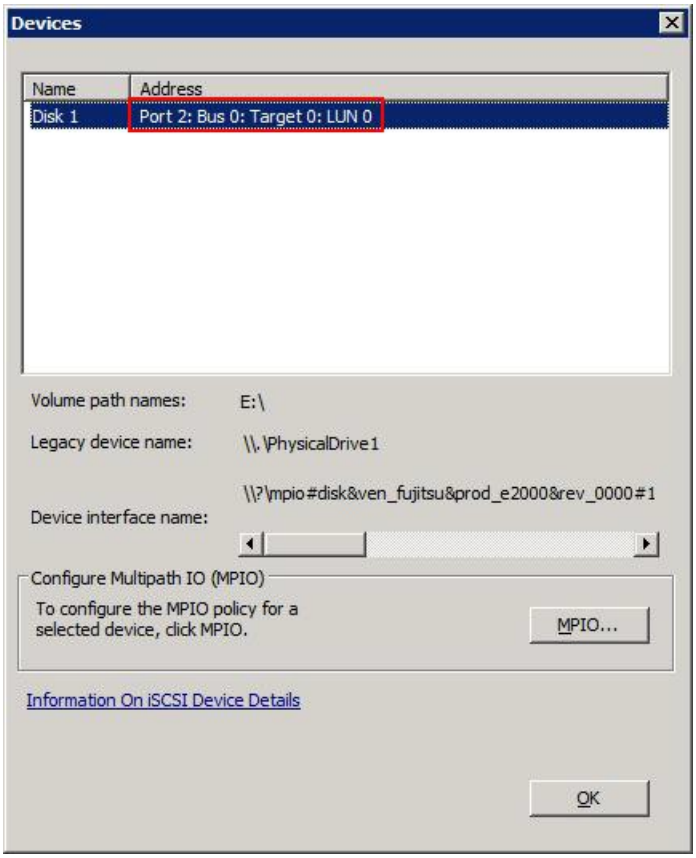
7. The [Source Portal] column in the [Multiple Connected Session (MCS)] window displays IP addresses. Check whether any IP address matches that recorded in step 2.
   If an IP address matches (192.168.3.150, in this example), this is the target connected to the device to be replaced.



8. Click the [Cancel] button to return to [Properties] window shown in step 5, and click the [Cancel] button again to return to the [iSCSI Initiator Properties] window shown in step 4.
9. If no IP address in step 6 matches, select the next target, and repeat step 4.
   Otherwise, click the [Devices] button.



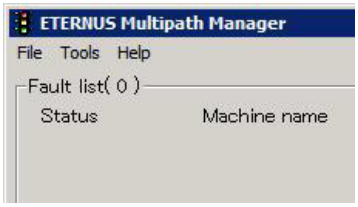
10. Record the values displayed in the [Address] column in the [Devices] window (Port 2: Bus 0: Target 0: LUN 0, in this example).



6.5.2 Disconnecting MPD

This section describes the procedure for disconnecting MPD.

1. Start ETERNUS Multipath Manager.
2. Confirm the address value recorded in step 10 in 6.5.1 Confirming the incorporation of a card with MPD. Then, place the target device offline. For a multifunction card, it is necessary to place more than one device offline.

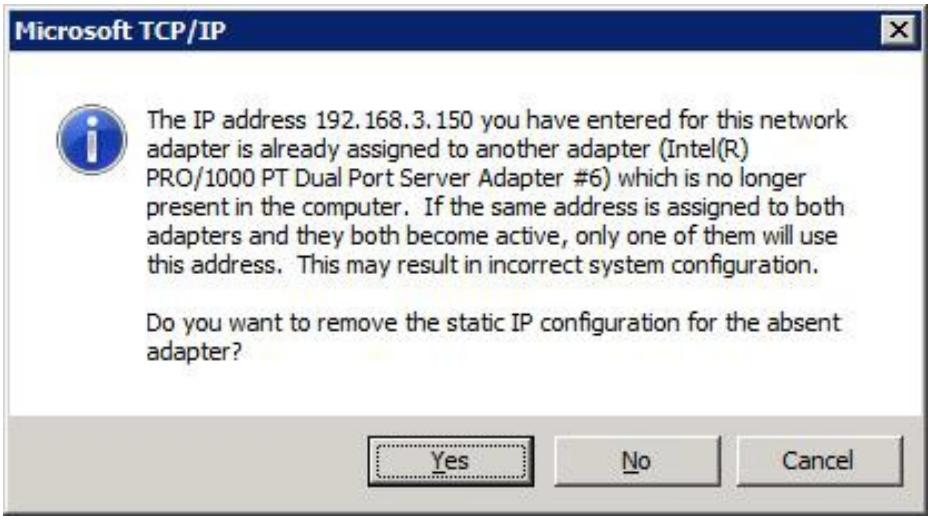


Note
In case of multi-function card, there are some cards that have same segment number, same bus number, and different function numbers.
In this case, please perform Step.3 to Step.5 of follows respectively.

3. Confirm target NIC in Device Manager.
Confirm NIC with step 2-a at 6.2.1 Replacement procedure in 6.2 Common Hot Plugging Procedure for PCI Express cards.
4. Disable target NIC in Device manager.
Disable NIC with step 2-b at 6.2.1 Replacement procedure in 6.2 Common Hot Plugging Procedure for PCI Express cards.
5. Stop target NIC by using safely remove devices from computer.
Stop NIC with step 3 at 6.2.1 Replacement procedure in 6.2 Common Hot Plugging Procedure for PCI Express cards.

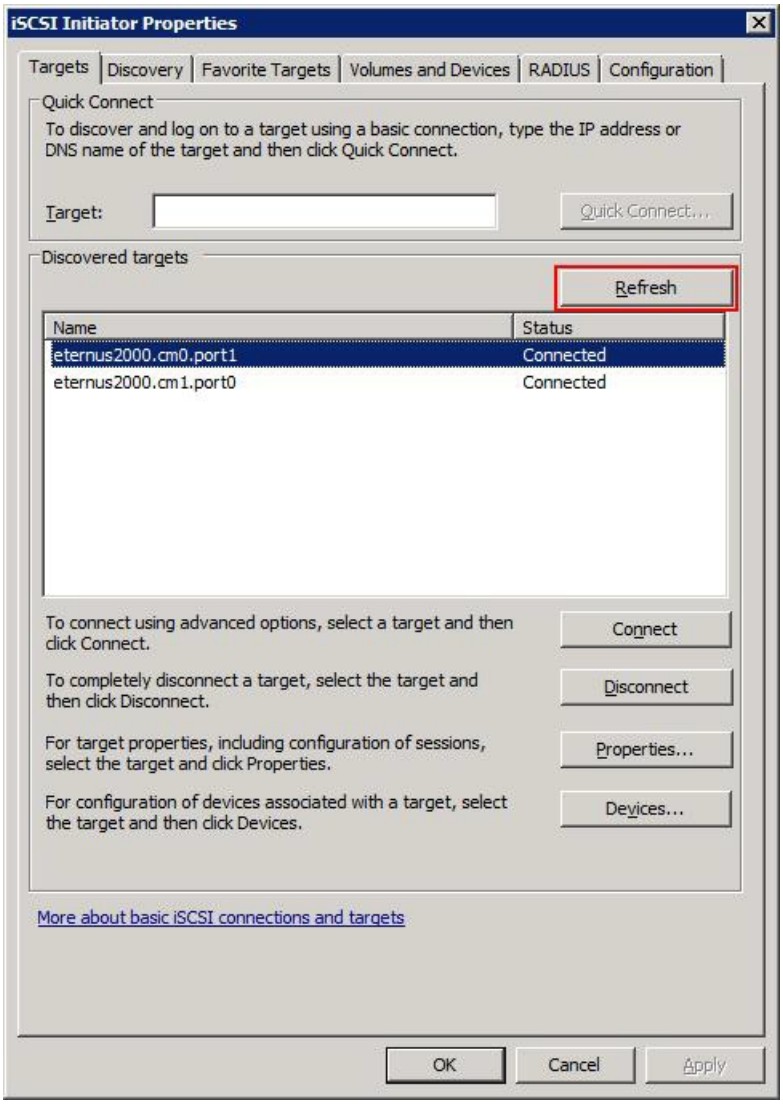
6. Replace NIC by using MMB Maintenance Wizard. [FE's work]
   Replace NIC with step 4 at 6.2.1 Replacement procedure in 6.2 Common Hot Plugging Procedure for PCI Express cards.
   Note
   In case of using SVagent, "Source:SVagent, ID: 25004 Error massage" is logged in SEL when replacing, it is no problem.

7. Set an IP address for the replacement device.
   Set the IP address and subnet mask recorded in step 2.
   Remarks
   If the following message appears when you set the IP address, select [Yes].


Microsoft TCP/IP
The IP address 192.168.3.150 you have entered for this network adapter is already assigned to another adapter (Intel(R) PRO/1000 PT Dual Port Server Adapter #6) which is no longer present in the computer. If the same address is assigned to both adapters and they both become active, only one of them will use this address. This may result in incorrect system configuration.
Do you want to remove the static IP configuration for the absent adapter?
Yes
No
Cancel

8. Click the [Refresh] button on the [Targets] tab in the [iSCSI Initiator Properties] window. Confirm that the target status becomes [Connected].

Windows Server 2008 R2


iSCSI Initiator Properties
Targets
Discovery
Favorite Targets
Volumes and Devices
RADIUS
Configuration
Quick Connect
To discover and log on to a target using a basic connection, type the IP address or DNS name of the target and then click Quick Connect.
Target:
Quick Connect...
Discovered targets
Refresh
Name
Status
eternus2000.cm0.port1
Connected
eternus2000.cm1.port0
Connected
To connect using advanced options, select a target and then click Connect.
Connect
To completely disconnect a target, select the target and then click Disconnect.
Disconnect
For target properties, including configuration of sessions, select the target and click Properties.
Properties...
For configuration of devices associated with a target, select the target and then click Devices.
Devices...
More about basic iSCSI connections and targets
OK
Cancel
Apply

CHAPTER 7 Backup and Restore

This chapter describes the backup and the restore operations required for restoring server data.

7.1 Backing Up and Restoring Configuration Information

The PRIMEQUEST 2000 series has partitioning functions. These functions provide the user with partitions acting as independent servers. The user must configure the UEFI (Unified Extensible Firmware Interface) for each partition. The user can make these settings with operations on the MMB. The MMB has BIOS configuration information for each partition. It also has backup and restore functions for the configuration information on the MMB.

Notes

- Configuration information on the server must be backed up ahead of time. The backup enables restoration of the original information if the system becomes damaged or an operational error erases data on the server. Be sure to periodically backup server configuration information in case of such events.
- The PRIMEQUEST 2000 series server cannot be connected to an FDD (floppy disk) for backup, restore, or other such operations. To use an FDD, connect it to a remote PC or another server connected to the PRIMEQUEST 2000 series server.

This section describes the backup and the restore operations for UEFI configuration information and MMB configuration information.
For details on the backup and restore windows, see Chapter 1 MMB Web-UI (Web User Interface) Operations in the *PRIMEQUEST 2000 Series Tool Reference* (C122-E110EN).

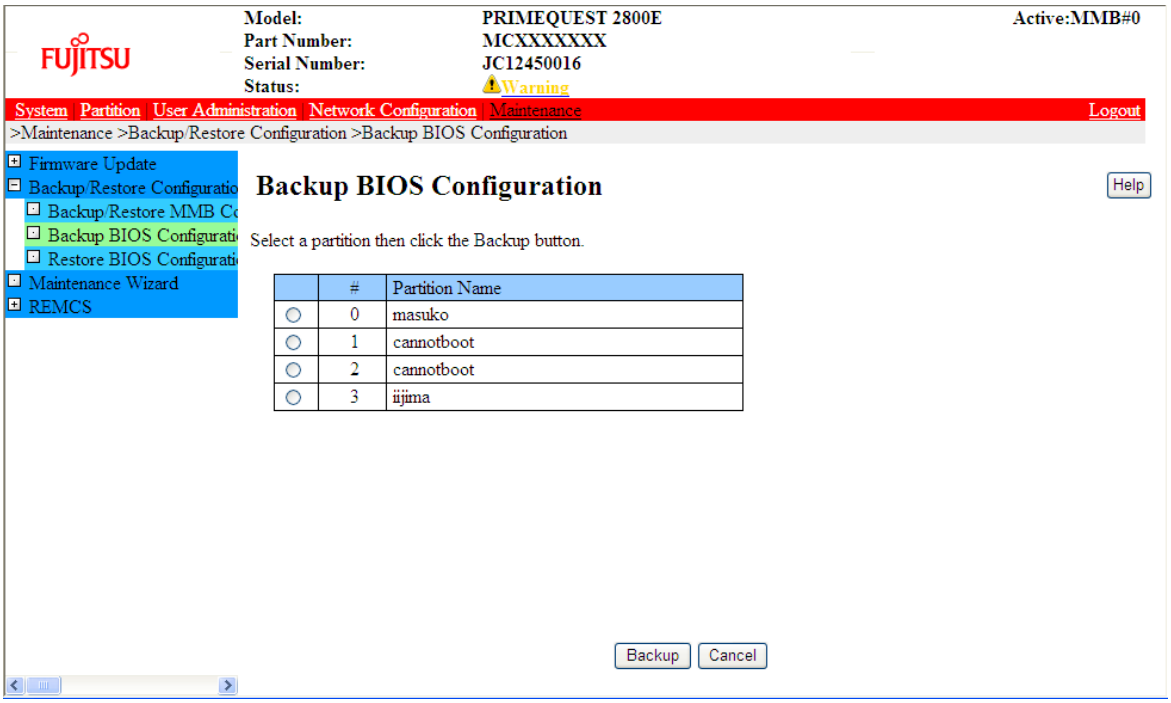
7.1.1 Backing up and restoring UEFI configuration information

Users can perform the following processes with the backup and restore functions for UEFI configuration information:

- Backing up all items that are set in the UEFI window
- Backing up the specified UEFI configuration information in a UEFI window for one partition from the MMB. This backup information can be applied to other partitions.
- Restoring backed-up UEFI configuration information during replacement of a faulty SB
- Restoring and copying the configuration information saved on a certain partition to another partition

A remote terminal can store the saved information. The data saved to the remote terminal can be restored. In the [Backup BIOS Configuration] window of the MMB Web-UI, back up UEFI configuration information to the PC running your browser. The procedure is as follows.

FIGURE 7.1 [Backup BIOS Configuration] window



Backing up UEFI configuration information

1. Select the radio button of the partition for which to back up the configuration information. Then, click the [Backup] button.
   The save destination dialog box of the browser appears.
2. Select the save destination path. Then, click the [OK] button.
   Download of the file begins.
   The default BIOS Configuration file name for the backup is as follows:
   Partition number_save date_BIOS version.dat

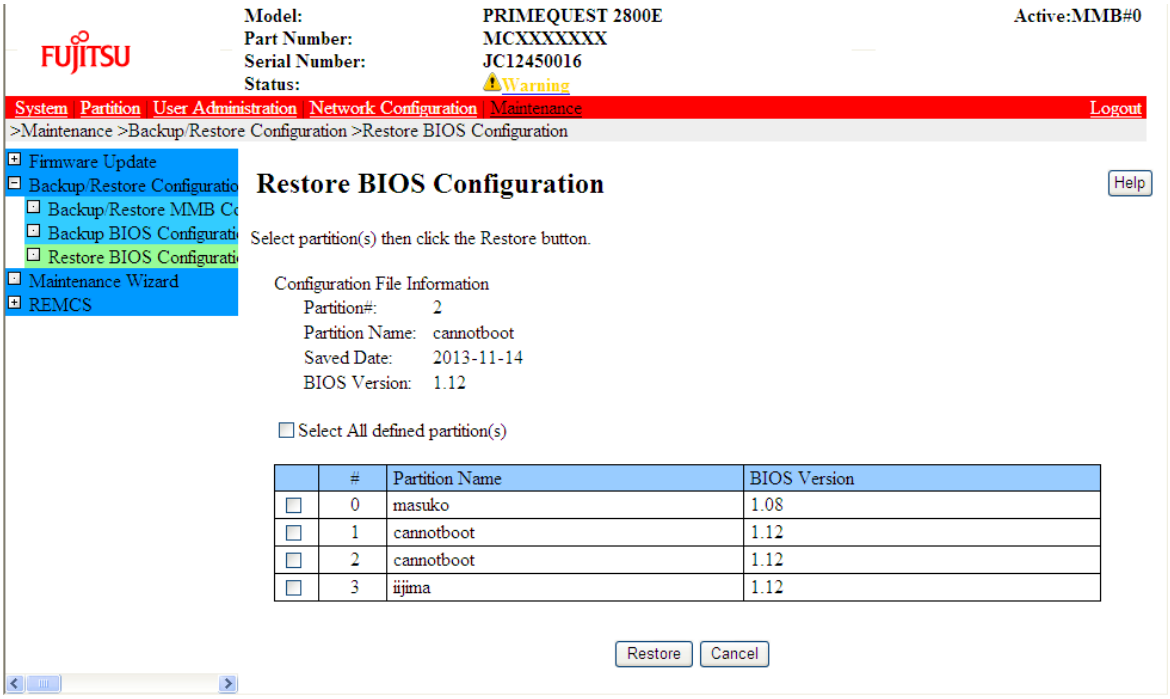
Restoring UEFI configuration information

From the [Restore BIOS Configuration] window, restore BIOS configuration information.

FIGURE 7.2 [Restore BIOS Configuration] window

1. Select the backup BIOS Configuration file stored on the remote PC. Then, click the [Upload] button.
   File transfer to the MMB begins.
   The following window appears when the file transfer is completed.

FIGURE 7.3 [Restore BIOS Configuration] window (partition selection)

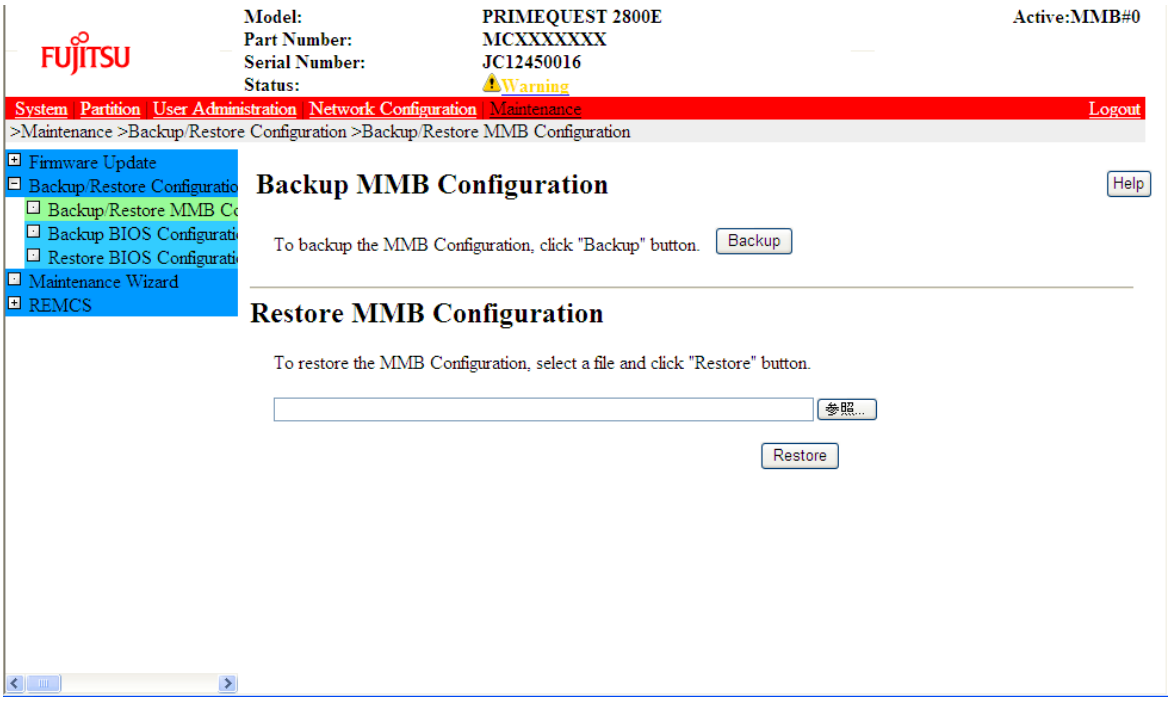


2. Select the partition to restore. Then, click the [Restore] button.

7.1.2 Backing up and restoring MMB configuration information

From the Backup/Restore MMB Configuration window, you can back up and restore MMB configuration information. The procedure is as follows.

FIGURE 7.4 [Backup/Restore MMB Configuration] window



Backing up MMB configuration information

1. Click the [Backup] button.
   The browser dialog box for selecting the save destination appears.
2. Select the save destination path. Then, click the [OK] button.
   Download of the file begins. The default MMB Configuration file name for the backup is as follows:
   MMB_(*save date*)_(*MMB version*).dat

Restoring MMB configuration information

1. Confirm that the system has stopped completely.
2. Select the backup MMB Configuration file stored on the Remote PC. Then, click the [Restore] button.
   File transfer to the MMB begins. A restore confirmation dialog box appears when the file transfer is completed.

FIGURE 7.5 Restore confirmation dialog box

3. To restore MMB configuration information, click the [OK] button. To cancel restoration, click the [Cancel] button.

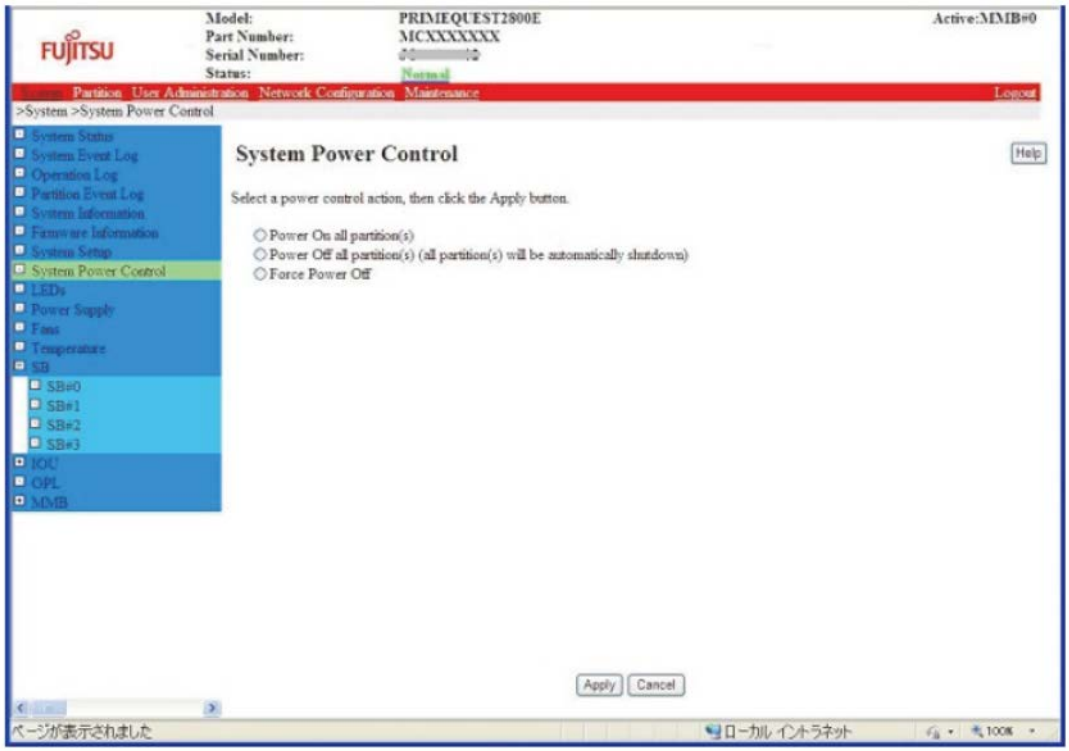
CHAPTER 8 Chapter System Startup/Shutdown and Power Control

This section describes the startup, shutdown and the power control in PRIMEQUEST 2000 series.

8.1 Power On and Power Off the Whole System

This section describes the power on and power off operations which are supported by the system.
The power control of the whole system is operated from the [System Power Control] window of the MMB.

FIGURE 8.1 [System Power Control] window



For details on the [System Power Control] window, see “1.2.8 [System Power Control] window in “PRIMEQUEST 2000 series Tool Reference” (C122-E177)

8.2 Partition Power on and Power off

This section describes various procedures of power on and Power off for the partition and explains the method of checking power supply.

8.2.1 Various Methods for Powering On the Partition

There are three methods for powering on the partition, which are as follows.

1. Operation through the MMB Web-UI or MMB CLI.
   The partition can be powered on through the MMB Web-U or MMB CLI operation. In this method, power on can be specified for all the partitions or specified in the partition unit.
2. Scheduled operation (Automatic operation according to a set schedule)
   A partition can be powered on by a scheduled operation (Automatic operation function). A partition unit can be powered on automatically by recording the time of power on in advance by the scheduled operation function.

3. Wake On LAN (WOL)
   The partition can be power on with WOL. In this method, power on can be specified for the relevant partition containing the IOU.

Notes

- You can enable or disable WOL of LAN ports on IOU per IOU by MMB Web-UI. Default value of WOL is 'disable'. If you use WOL of LAN port on IOU, set Onboard LAN Mode to 'Enabled' (WOL enable). For details on [Mode] window, see '[Mode] window' in "PRIMEQUEST2000 series *Tool Reference*" (C122-E177EN).
- If the power supply is stopped or IOU is pulled out, the setting of WOL is initialized.
  Restore the setting of WOL with Operating System.
- Enable or Disable WOL is set from both BIOS and the operating system.
  To enable WOL in Windows, following settings are required for each port of the device manager Check the [Wake On Magic Packet from the powered off state] checkbox in [Device Manager] - [Network Adaptor] - [INTEL (R) 82576 Gigabit Dual Port Network Connection] - [Property] - [Power Management].
  In case of setting in windows, "Intel PROSet" of the supplied driver must be installed.
- In Legacy Boot (ROM Priority is Legacy), operating system cannot boot from a HDD included a SB other than Home SB. Move the HDD installing operating system into HDD slot on Home SB or set the SB including the HDD installing operating system as Home SB.
- After switching Home SB, the number of 'Reset' registered in SEL increase by one only first time when the particular partition starts.

8.2.2 Partition Power on unit

The units that can be powered on and the power on methods are given below. For details on the privileges of the partition power on operation, see '1.1 WEB-UI Menu List' in "PRIMEQUEST 2000 series Tool Reference" (C122-E177).

TABLE 8.1 Power on method and power on unit

Power on method	Power on unit: Entire partition	Power on unit: Single partition	Remarks
MMB Web-UI, MMB CLI	Power on is posssible	Power on is posssible	
Scheduled operation	Power on is not possible	Power on is posssible	Automatic operation
Wake On LAN (WOL)	Power on is not possible	Power on is posssible	Corresponding partition unit which includes IOU.

8.2.3 Types of Power off Method of Partition

The three methods to power off the partition are as follows.

1. Shutdown from the operating system (Recommended)
   Shutdown the operating system by using the operating system commands. When powering off the partition, perform the shutdown from the operating system. For the operating system shutdown commands, refer to the manual of each operating system.
2. Powering off of the partition using the [MMB Web-UI] window or the MMB CLI.
   The power can be turned off by the Web window operation of an external terminal, or the MMB CLI. In such operations, all partitions can be powered off, or a partition unit can be powered off. .
3. Powering off a partition by a scheduled operation.
   A partition can be powered off by a scheduled operation (Automatic operation function). A partition unit can be automatically powered off by registering the powering off time in advance by a scheduled operation function.

8.2.4 Powering Off Partition Units

The units that can be powered off and how to power off a partition unit is shown below. For details on the operation privileges for powering off partitions, see '1.1 Menu list of WEB-UI' in "PRIMEQUEST 2000 series Tool Reference" (C122-E177).

TABLE 8.2 Power on method and Power on unit

Power off method	Power on unit: All partitions	Power on unit: Single partition	Remarks
MMB Web-UI, MMB CLI	Power off is possible	Power off is possible	
Schedule operation	Power off is not possible	Power off is not possible	Automatic operation

Notes
In the following cases, confirm the details according to '10.2 Troubleshooting'. If the error recurs, contact your sales representative or field engineer.
Before contacting, confirm the model name and serial number shown on the label affixed on the main unit.
Until the problem is solved, do not execute [Reset], [Force Power Off] for the partition.

- When [Power Off], [Reset], or [Force Power Off] is executed for partition, or when shutting down from the operating system, the MMB Web-UI (Information area) status changes to "Error".
- When the MMB Web-UI displays the status of each component, "Read Error" will be displayed in the Part number and Serial number.

8.2.5 Procedure for Partition Power On and Power Off

There are single as well as multiple partitions. Power on /Power off operation is also the same in case of multiple partitions. If multiple partitions share one external device, first turn off the power source for multiple partitions; and then power off the external device. The privileges for powering on and powering off the partitions are as follows.

TABLE 8.3 Privilege for power on and power off

User Privilege	Power on and power off privilege
Administrator	Has permission for all partitions.
Operator	Has permission for all partitions.

TABLE 8.4 Privilege for power on and power off (continued)

User Privilege	Power on and power off privilege
Partition Operator	Has permission for only the partition authorized for the user.
User	Does not have permission for any partition
CE	Does not have permission for any partition

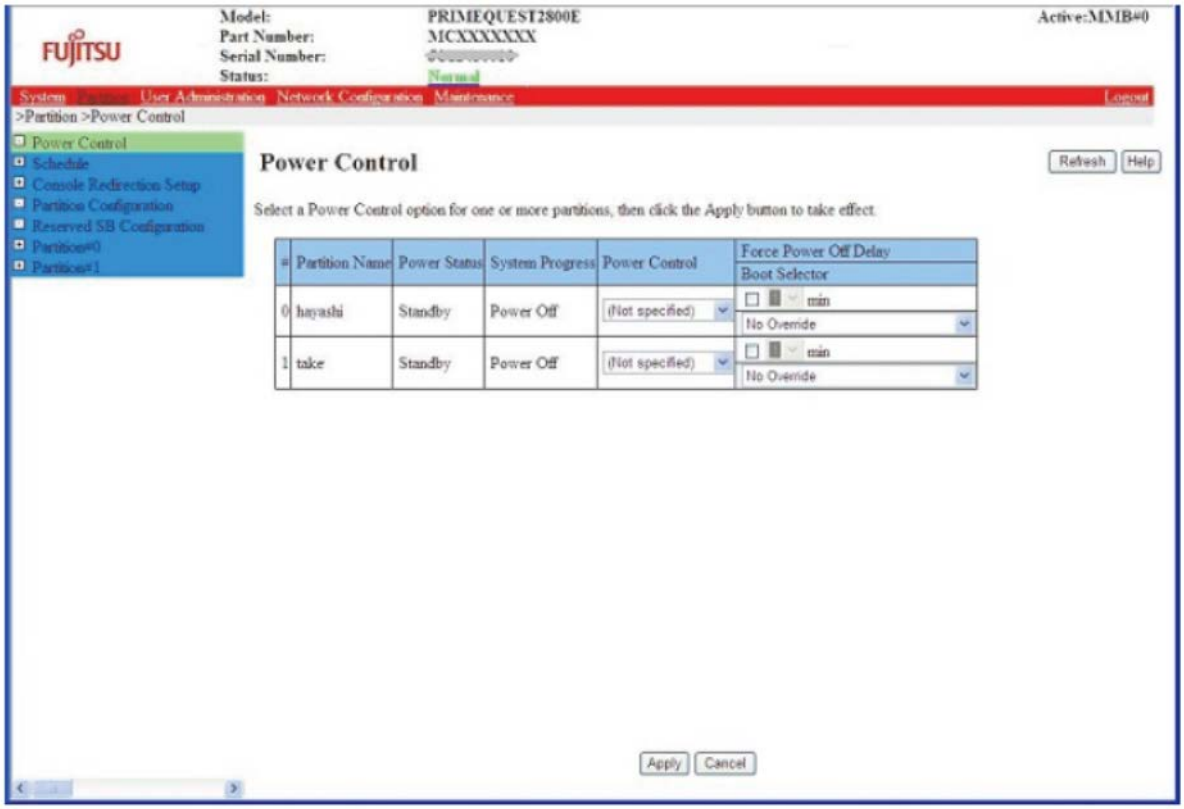
For the details on the user privileges of the MMB Web-UI menu, see '1.1 Menu list of Web-UI' in "PRIMEQUEST 2000 series Tool Reference" (C122-E177).

8.2.6 Partition Power on by MMB

This section describes the procedure of powering on the partition by MMB.

1. Log into the MMB Web-UI.
   -> [MMB Web-UI] window appears.
2. Click [Partition] - [Power Control].
   -> [Power Control] window appears. This window displays only the partitions having an SB or IOU.

FIGURE 8.2 [Power Control] window



"#" column has the partition number.
For the details of [Power Control] window, see '1.3.1 [Power Control] window' in "PRIMEQUEST 2000 series Tool Reference" (C122-E177).

3. Click the [Apply] button after the [Power Control] of the partition to be powered on is set to [Power-On].
   -> A confirmation dialog box appears.

4. Click the [OK] button to execute, and click the [Cancel] button to cancel.

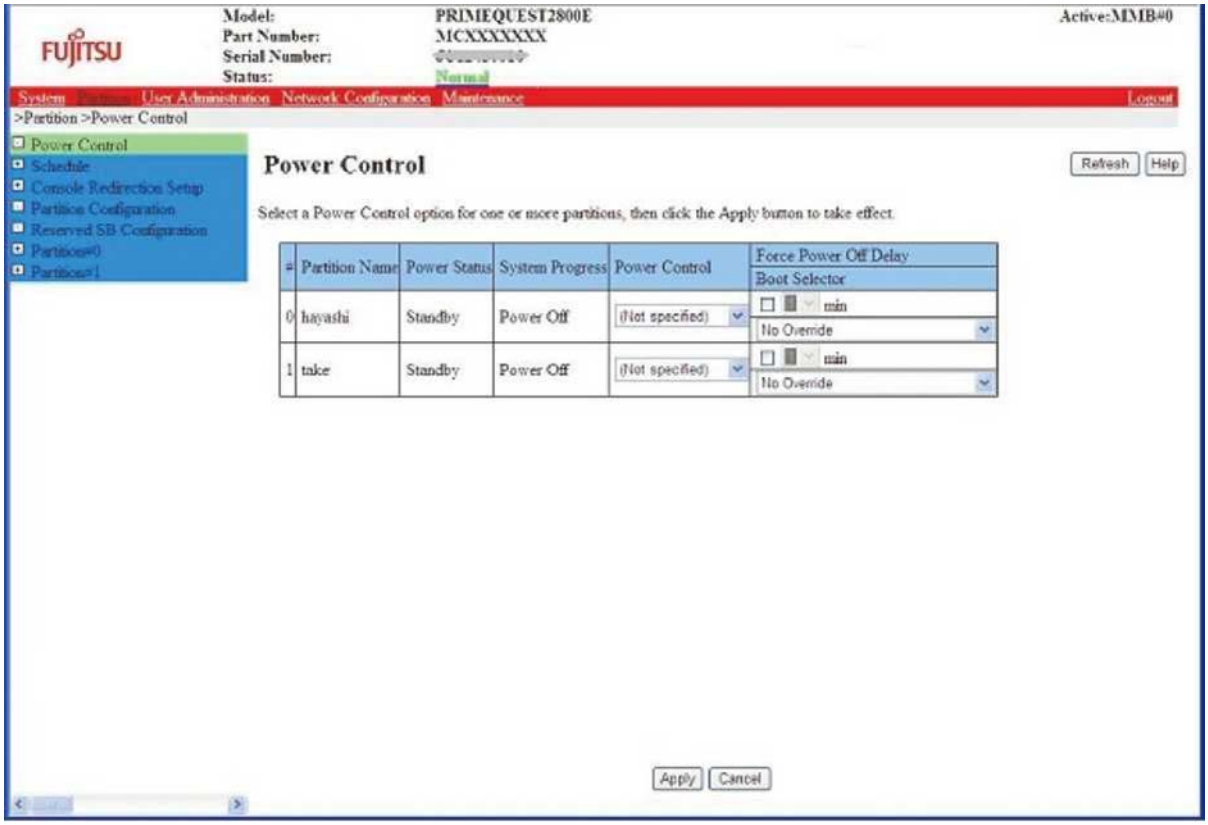
Remarks
A warning message appears if the partition is already powered on, or if the specified control fails because the power is turned off.
For the details on the display and setting items, see '1.3.1 [Power Control] window' in "PRIMEQUEST 2000 series Tool Reference" (C122-E177).

8.2.7 Controlling Partition Startup by using the MMB

Only users with Administrators or Operator privileges can set partition boot control. This section describes the partition startup control procedure using the MMB.

1. Click [Partition] - [Power Control].
   -> The [Power Control] window appears.

FIGURE 8.3 [Power Control] Window



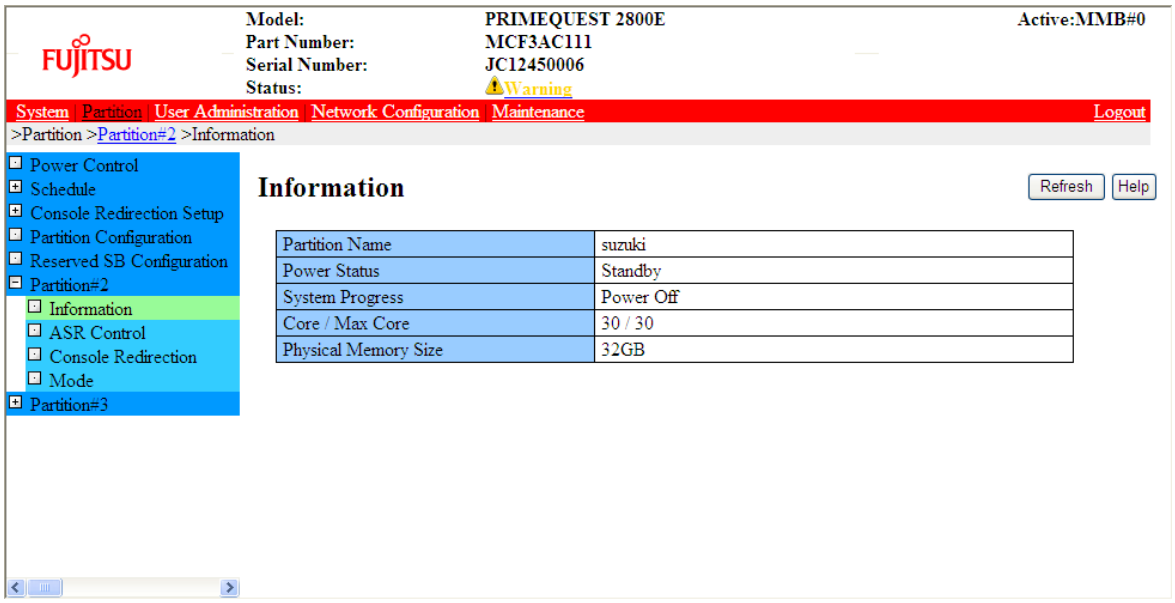
For the details on the contents and setting items of the [Power Control] window, see ‘1.3.1 [Power Control] Window’ in “PRIMEQUEST 2000 series Tool Reference” (C122-E177).

8.2.8 Checking the Partition Power status by using the MMB

This section describes the procedure by which power status of partition is confirmed.

1. Log in MMB Web-UI.
   -> The MMB Web-UI window appears.
2. Click [Partition] - [Partition#x] - [Information] from menu of Web-UI.
   -> The [Information] window appears.

FIGURE 8.4 [Information] window



The power status of the partition is displayed in [Power Status].
For details on the contents and setting items of the [Information] window, see '1.3.8 [Partition#x] menu' in "PRIMEQUEST 2000 series Tool Reference" (C122-E177).

Powering off a partition by using the MMB

This section describes the powering off procedure using the [MMB Web-UI] window.

- Log into the MMB Web-UI.
  -> The MMB Web-UI window appears.
- Click [Partition] - [Power Control] from the menu of the Web-UI.
  -> The [Power Control] window appears

FIGURE 8.5 [Power Control] window

The "#" column has the partition number.
For details on the [Power Control] window, see ‘1.3.1 [Power Control] window’ in “PRIMEQUEST 2000 series Tool Reference” (C122-E177).

3. Set the ‘Power Control’ of the partition number to be powered off to [Power Off], and click the [Apply] button.
   -> The specified partition will be powered off.

Remarks
In Windows, Server View Agent is required when shutdown is executed from the MMB Web-UI. For details on the method of setting the Server View Agent, see the description of ‘System shutdown’ tab in the “Server View Operations Manager Installation Server View Agents for Windows”.
In VMware, shutdown cannot be performed by VMware. Perform shutdown on VMware.

8.3 Scheduled operations

This section describes scheduled operations.

8.3.1 Powering on a partition by scheduled operation

When a scheduled operation is set for a partition, power is turned on, at the set time.
Daily, weekly, monthly, specific date or a combination of these options can be set as a schedule.
Note
The times recorded in the SEL may lag behind the scheduled operation as can be seen below.

- After the configuration check and preparation for the startup has been carried out, the power is turned on. It takes a while to start. In such case, the display of the SEL may be delayed by six to eight seconds, from the scheduled operation time.
- Shutdown instruction from the MMB to the operating system is executed within few seconds from the set time. However, the time shown below may change under various conditions, like setting, configuration, etc.

- Time till the instruction reaches the operating system from the MMB
- Time until the operating system shutdown is started and time until the start of the operating system shutdown is notified to the MMB
- Even if the [Power on Delay] is set to 0 seconds, it may take 30 ~ 70 seconds from the time of turning on the power and starting, up to reset.

For the scheduled setting, see '1.3.2 [Schedule] menu' in "PRIMEQUEST 2000 series Tool Reference" (C122-E177).

8.3.2 Power off a Partition by scheduled operation

When a scheduled operation is set for a partition set, power is turned off at the set time.
A daily, weekly, monthly, specific date or a combination of these options can be set a schedule.
For the details on schedule settings, see '1.3.2 [Schedule] menu' in "PRIMEQUEST 2000 series Tool Reference" (C122-E177).

8.3.3 Relation of scheduled operation and power restoration function

In the PRIMEQUEST 2000 series, scheduled operation and power restoration function are linked when power restoration mode is set to "Schedule Sync".

TABLE 8.5 Relationship between scheduled operation and partition power restoration mode

No.	When there is power failure	When the power is restored	Always OFF (*1)	Always ON (*1)	Restore (*1)	Schedule Sync (*1)
1	Outside the operation time	Within the operation time	OFF	ON	OFF	ON
2	Within the operation time	Within the operation time	OFF	ON	ON	ON
3	Outside the operation time	Outside the operation time	OFF	ON	OFF	OFF
4	Within the operation time	Outside the operation time	OFF	ON	ON	OFF

ON: Partition Power On, OFF: Partition Power Off

Notes

Operations indicated by (*1) in the table, assume normal shutdown when a power failure occurs. If there is an abnormal power off because the UPS had not been used, the partition will not automatically start (= OFF mode operation) in a restoration operation, irrespective of the operation settings.

8.3.4 Scheduled operation support conditions

The description of power on/off items, scheduled operation support conditions and menu items are listed in the table below.

TABLE 8.6 Power on/off

Menu Item	Scheduled operations	Description
All Partition Power On	Not supported	Powers on all partitions.
All Partition Power Off	Not supported	Powers off all the partitions which are in powered on, following an operating system shutdown.
Partition Power On	Supported	Powers on any partition.
Partition Power Off	Supported	Powers off any partition following an operating system shutdown.
Partition Force Power Off	Not supported	Forcibly powers off any partition without an operating system shutdown. This is used, to forcibly power off a partition, when the shutdown from the operating system is disabled.
Power Cycle	Not supported	Powers off and then powers on any partition. The partition is forcibly powered off without an operating system shutdown.

Menu Item	Scheduled operations	Description
Reset	Not supported	Resets any partition. This reset is not followed by a reboot of the operating system.
NMI	Not supported	Issues an NMI interrupt for any partition.
sadump	Not supported	Instructs sadump for a partition.

For details on setting for Windows shutdown, see ‘Appendix I Windows Shutdown Settings’.

8.4 Automatic Partition Restart Conditions

This section describes the setting of conditions to execute automatic partition restart.

8.4.1 Setting automatic partition restart conditions

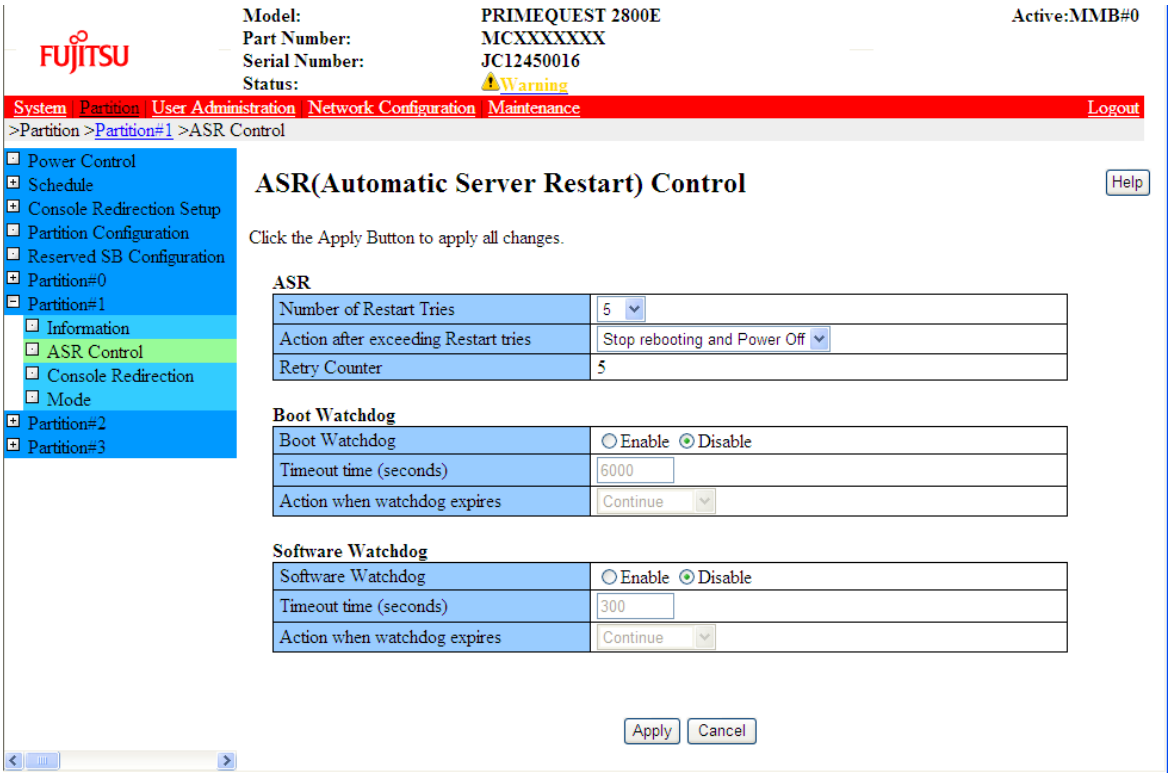
Users with Administrators/Operator privilege can set all the partitions, however, only users with Partition Operator privilege can set the permitted partitions.
Note

- Check the [Cancel Boot Watchdog] check box and execute.
  - Installation of operating system
  - Starting in the single user mode
  - Backup/ restoration by System cast Wizard Professional
    When the above mentioned operations are executed with the Boot Watchdog in the [Enable] status, the specified action (Stop rebooting and Power Off or Stop rebooting or Diagnostic Interrupt assert) will be executed after repeating the operating system restart for specified number of times. The number of retries to restart the operating System and the actions to be executed depend on the settings in the [ASR (Automatic Server Restart) Control] window of the MMB.
    At that time, Boot Watchdog can be forcibly set to [Disable] by checking the check box of [Cancel Boot Watchdog] and clicking the Apply button in the [ASR (Automatic Server Restart) Control] window.

The procedure of automatic restart condition setting of the partition is as follows.

1. Click [Partition] - [Partition#x] - [ASR Control].
   -> The [ASR Control] window appears.

FIGURE 8.6 [ASR (Automatic Server Restart) Control] window



2. Set the automatic restart conditions.
   The setting items of the [ASR Control] window are listed in the table below.

TABLE 8.7 [ASR Control] window display / setting items

Display Items /Setting Items	Contents
Number of Restart Tries	Set the generation of Timeout and the number of retries to start the operating system, using Boot Watchdog and SVmco Software. 0 to10 times can be set. When 0 is specified, there is no retry. The default is five times.
Action after exceeding Restart Tries	Set the action to be performed in 'Watchdog Timeout' in case Restart is repeated and exceeds the above note retry frequency. . There are following items are available as Action. - Stop rebooting and Power Off: Stops the reboot and powers off the partition. - Stop rebooting: Stops the rebooting and stops the partition. - Diagnostic Interrupt assert: Stops the reboot and instructs for NMI interrupt for the partition. Tries to collect data (dump) for investigating the cause of stopping the partition. The default is 'Stop rebooting and Power Off'.
Retry Counter	Displays the remaining number of retries possible.
Cancel Boot Watchdog	Cancels the operating system Boot monitoring. The default value is the check box being Off.

3. Check the [Cancel Boot Watchdog] check box to cancel the Boot Watchdog function.

4. Click [Apply] button.
   Set the operating system Boot monitoring cancellation. Further, even though [Cancel Boot Watchdog] check box was set to On, it changes to Off after clicking [Apply] button.

For details on the operation of [ASR Control] window, see '1.3.8 [Partition#x] menu' in "PRIMEQUEST 2000 series Tool Reference" (C122-E177).

8.5 Power Restoration

In the PRIMEQUEST 2000 series, the system operations for power restoration can be set in the chassis unit. This can be set by MMB Web-UI.

8.5.1 Settings for Power Restoration

When using a UPS, the following items can be set when a power failure is detected. The default is “Restore”.

TABLE 8.8 Power Restoration Policy

Item	System operation
Always Off	Continues the power off status after the power is restored.
Always On	Power on the partition after restoring the power irrespective of the status of the power failure.
Restore	Returns to the state at the time when the power failure occurred. Powers on the partitions that were On when the power failure occurred, and retains the power off status for partitions that were powered off when the power failure occurred.
Schedule Sync	Automatically powers on the partition, according to the scheduled operation settings when a power failure had occurred during working hours. (*1)

*1: For details on the scheduled operations, see ‘8.3 Scheduled operations’.

If the startup of an external SAN unit connected to the UPS and such unit is slow during power restoration, then the SAN device does not become usable if the partition is powered on by the server. Therefore, SAN boot may fail. In that case, “Partition Power On Delay” (units of seconds: 0 to 9999 seconds, default = 0 seconds) can be set in addition to the above mentioned settings.
For details on the method of settings for power failure/restoration, see ‘1.2.7 [System Setup] window’ in “PRIMEQUEST 2000 series Tool Reference” (C122-E177).

8.6 Remote shutdown (Windows)

Windows with versions of Windows XP onwards, comes with a ‘shutdown.exe’ command. This command can be used for remote shutdown from a management terminal.

8.6.1 Prerequisites for remote shutdown

The following are the prerequisites for using the remote shutdown (Windows).

- The operating system of the management terminal should be one of the following.
  - Windows Server 2012 R2
  - Windows 8
  - Windows Server 2012
  - Windows 7
  - Windows Server 2008 R2
  - Windows Server 2008
  - Windows Server 2003 R2
  - Windows Server 2003 -Windows Vista
  - Windows XP
- The management terminal to be shutdown should be connected to Windows through a network.
- Firewall settings of the target Windows
  In the [Exception] settings of the firewall, [File and Printer Sharing] check box must be checked.

- When target is work group environment
  The user name and password of the management terminal must match those of the target Windows to be shut down.
- When the target is an Active Directory environment
  A user with administrative privileges for the Windows to be shut down must log in to the management terminal.

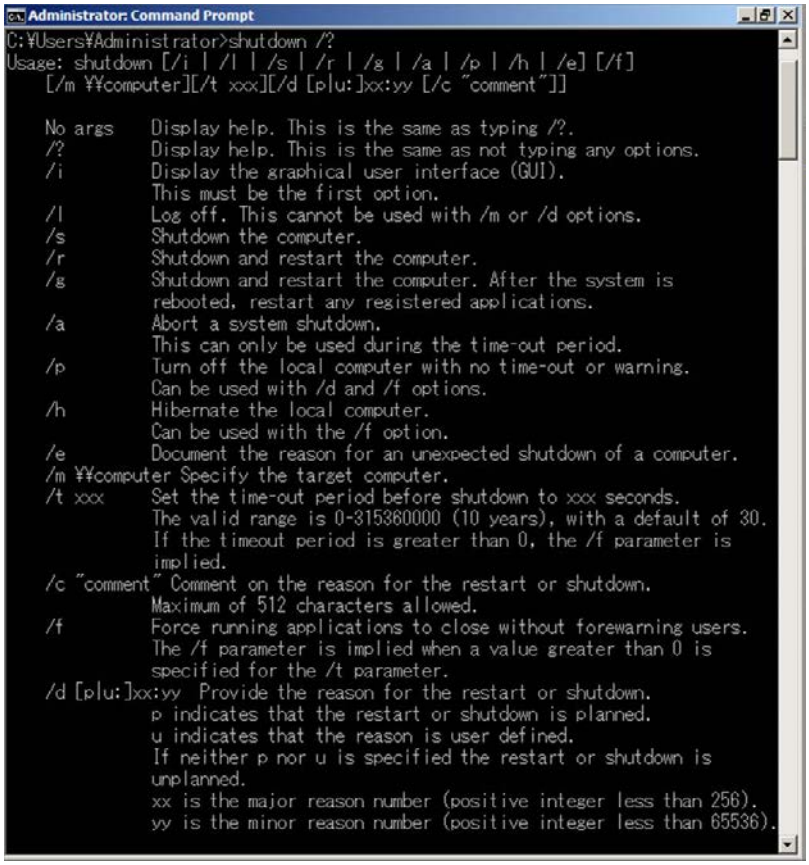
8.6.2 How to use remote shutdown

To perform remote shutdown, log in to the management terminal and enter the shutdown command.

```
shutdown -s -m ¥¥<Server Name>
```

In <Server Name>, specify the computer name of the Windows to be shut down.
For details on other options of the shutdown command, see 'Help'.
When the shutdown command is executed by using /? Option displays a simplified help.

Figure 8.7 Simplified help for the shutdown command


Administrator: Command Prompt
C:¥Users¥Administrator>shutdown /?
Usage: shutdown [/i | /l | /s | /r | /g | /a | /p | /h | /e] [/f]
[/m ¥¥computer][/t xxx][/d [p|u:]xx:yy [/c "comment"]]
No args Display help. This is the same as typing /?.
/? Display help. This is the same as not typing any options.
/i Display the graphical user interface (GUI).
This must be the first option.
/l Log off. This cannot be used with /m or /d options.
/s Shutdown the computer.
/r Shutdown and restart the computer.
/g Shutdown and restart the computer. After the system is
rebooted, restart any registered applications.
/a Abort a system shutdown.
This can only be used during the time-out period.
/p Turn off the local computer with no time-out or warning.
Can be used with /d and /f options.
/h Hibernate the local computer.
Can be used with the /f option.
/e Document the reason for an unexpected shutdown of a computer.
/m ¥¥computer Specify the target computer.
/t xxx Set the time-out period before shutdown to xxx seconds.
The valid range is 0-315360000 (10 years), with a default of 30.
If the timeout period is greater than 0, the /f parameter is
implied.
/c "comment" Comment on the reason for the restart or shutdown.
Maximum of 512 characters allowed.
/f Force running applications to close without forewarning users.
The /f parameter is implied when a value greater than 0 is
specified for the /t parameter.
/d [p|u:]xx:yy Provide the reason for the restart or shutdown.
p indicates that the restart or shutdown is planned.
u indicates that the reason is user defined.
If neither p nor u is specified the restart or shutdown is
unplanned.
xx is the major reason number (positive integer less than 256).
yy is the minor reason number (positive integer less than 65536).

CHAPTER 9 Configuration and Status Checking (Contents, Methods, and Procedures)

This chapter describes functions for checking the configuration and status of the PRIMEQUEST 2000 series server. The functions are broken down by firmware (or other software) and by tool.

9.1 MMB Web-UI

The PRIMEQUEST 2000 series unifies server management via the MMB Web-UI. The following lists the functions provided by the MMB Web-UI.
For details on the functions, see the reference sections in the PRIMEQUEST 2000 Series Tool Reference (C122-E177EN).

TABLE 9.1 Functions provided by the MMB Web-UI

Function	Reference sections in the PRIMEQUEST 2000 Series Tool Reference (C122-E177EN)
Displays the status of the whole system.	1.2.1 [System Status] window
Displays the events stored in the SEL (System Event Log) of the MMB.	1.2.2 [System Event Log] window
Displays logs related to Web-UI and CLI settings and operations.	1.2.3 [Operation Log] window
Displays hardware problem information (REMCS notification target message).	1.2.4 [Partition Event Log] window
Displays information related to the PRIMEQUEST 2000 series system. Sets the name of the PRIMEQUEST 2000 series system (cabinet). Sets an Asset Tag (asset management number).	1.2.5 [System Information] window
Displays a firmware version.	1.2.6 [Firmware Information] window
Sets a system configuration.	1.2.7 [System Setup] window
Controls the system power.	1.2.8 [System Power Control] window
Displays the LED status.	1.2.9 [LEDs] window
Displays the PSU status. Displays the action taken in response to a PSU failure.	1.2.10 [Power Supply] window
Displays the fan status. Displays the reaction response to a fan failure.	1.2.11 [Fans] window
Displays the temperature of the temperature sensor in the system. Displays the reaction response to a temperature error.	1.2.12 [Temperature] window
Displays and sets the SB#x board.	1.2.13 [SB] menu
Displays and sets the IOU#x board.	1.2.14 [IOU] menu
Displays and sets the status of DU #x.	1.2.15 [DU] menu
Displays the status of the PCI_Box connected to the system	1.2.18 [PCI_Box] menu
Displays the OPL status.	1.2.16 [OPL] window
Displays information related to the MMB.	1.2.17 [MMB] menu
Controls the partition power supply.	1.3.1 [Power Control] window
Sets a schedule for each partition.	1.3.2 [Schedule] menu
Sets the SB and IOU that configure a partition.	1.3.3 [Partition Configuration] window

Function	Reference sections in the PRIMEQUEST 2000 Series Tool Reference (C122-E177EN)
Sets a Reserved SB.	1.3.5 [Reserved SB Configuration] window
The video redirection for each IPv4/IPv6 is set.	1.3.6 [Console Redirection Setup] window
Power Limiting of each partition is set.	1.3.7 [Power Management Setup] window
Displays the partition status and various information related to the partition.	1.3.8 [Partition#x] menu
Sets conditions for automatically restarting the partition (ASR (Automatic Server Restart) Control).	1.3.8 [Partition#x] menu
Starts video redirection.	1.3.8 [Partition#x] menu
Sets various modes for the partition.	1.3.8 [Partition#x] menu
Displays information on the currently registered user account.	1.4.1 [User List] window
Changes the password of the currently logged-in user.	1.4.2 [Change Password] window
Displays a list of users connected to the MMB via Serial, Telnet/SSH, and Web-UI.	1.4.3 [Who] window
Sets the MMB date and time.	1.5.1 [Date/Time] window
Sets the IP address and other values for MMB access.	1.5.2 [Network Interface] menu
Sets Speed/Duplex of each port on the MMB board.	1.5.3 [Management LAN Port Configuration] window
Sets the network protocol of the MMB.	1.5.4 [Network Protocols] window
Configures automatic update for Web-UI windows whose status changes.	1.5.5 [Refresh Rate] window
Makes settings related to SNMP.	1.5.6 [SNMP Configuration] menu
Sets an SNMP trap destination.	1.5.6 [SNMP Configuration] menu
Sets the Engine ID and makes user settings specific to SNMP v3.	1.5.6 [SNMP Configuration] menu
Creates a secret key and the corresponding CSR (signature request).	1.5.7 [SSL] menu
Retrieves the secret key or CSR (signature request) stored on the MMB.	1.5.7 [SSL] menu
Imports the signed electronic certificate sent from the certificate authority to the MMB.	1.5.7 [SSL] menu
Creates a self-signed certificate.	1.5.7 [SSL] menu
Creates a private key for the SSH server.	1.5.8 [SSH] menu
Makes the user settings required for control of the MMB via RMCP from the remote server.	1.5.9 [Remote Server Management] window
Operates access control for network protocols.	1.5.10 [Access Control] window
Sets e-mail notification for when an event occurs.	1.5.11 [Alarm E-Mail] window
Executes the batch firmware update process.	1.6.1 [Firmware Update] menu
Backs up and restores MMB/UEFI configuration information.	1.6.2 [Backup/Restore Configuration] menu
Provides support in the form of a wizard for device maintenance.	1.6.3 [Maintenance Wizard] window
Operates REMCS and makes settings related to REMCS.	1.6.4 REMCS menu

9.2 MMB CLI

You can access the MMB CLI via the MMB serial port or the management LAN. The commands that you can use from the MMB CLI include those for display and settings.
For details on MMB command lines, see Chapter 2 MMB CLI (Command Line Interface) Operations in the *PRIMEQUEST 2000 Series Tool Reference* (C122-E177EN).
For details on functions provided by the MMB CLI, see the reference sections in the *PRIMEQUEST 2000 Series Tool Reference* (C122-E177EN).

TABLE 9.2 Functions provided by the MMB CLI

Function	Reference sections in the *PRIMEQUEST 2000 Series Tool Reference* (C122-E177EN)
Sets information.	2.2 Setting Commands
Displays information.	2.3 Display Commands
Updates firmware.	2.4.1 update ALL
Displays the version and update status of firmware.	2.4.2 show update_status

9.3 UEFI

The following lists the functions provided by the UEFI. For details on the UEFI provided commands, see Chapter 4 UEFI Command Operations in the *PRIMEQUEST 2000 Series Tool Reference* (C122-E177EN).

TABLE 9.3 Functions provided by the UEFI

Function	Reference sections in the *PRIMEQUEST 2000 Series Tool Reference* (C122-E110EN)
Displays menus for migration to boot processing, Boot Manager, Device Manager, and Boot Maintenance Manager.	3.1 Boot Manager Front Page
Sends processing into automatic operating system startup and performs boot processing in the currently set boot sequence.	3.2 [Continue] Menu
Sets the boot devices.	3.3 [Boot Manager] Menu
Makes settings such as whether to assign an I/O space to each I/O device, CPU settings, and whether to enable PXE boot.	3.4 [Device Manager] Menu
Makes settings such as addition and deletion of boot options and boot priority changes.	3.5 [Boot Maintenance Manager] Menu
Setting of sadump environment	6 Setting of sadump environment

9.4 ServerView Suite

You can use ServerView Suite to visually confirm the PRIMEQUEST 2000 series configuration and the status of each part.
For details on how to operate ServerView, see the *ServerView Suite ServerView Operations Manager Server Management*.

CHAPTER 10 Error Notification and Maintenance (Contents, Methods, and Procedures)

This chapter describes the maintenance functions provided by the PRIMEQUEST 2000 series. It also describes the actions to take for any problems that occur.

10.1 Maintenance

The PRIMEQUEST 2000 series supports hot maintenance of PSUs and fans. This enables maintenance of the system as it continues operating. For PRIMEQUEST 2400E and 2800E, the DR fiction and PCI Hot Plug function can be used for hot maintenance of SB, IOU, HDD/SSD and PCI Express cards. For PRIMEQUEST 2800B, PCI Hot Plug function can be used for hot maintenance of HDD/SSD and PCI Express cards.
For details and a list of the replaceable components, see 'CHAPTER 3 Component Configuration and Replacement (Add, Remove)'.

Remarks

Field engineers perform the maintenance on the PRIMEQUEST 2000 series server.

10.1.1 Maintenance using the MMB

The MMB provides system maintenance functions through the [Maintenance] menu of the Web-UI.
You can use the [Maintenance] menu to back up and restore system configuration information.
For details on the [Maintenance] menu, see 1.6 [Maintenance] Menu in the *PRIMEQUEST 2000 Series Tool Reference* (C122-E177EN).

10.1.2 Maintenance method

Maintenance is performed with the Maintenance Wizard on the MMB Web-UI from a terminal such as a PC connected to the MMB in the PRIMEQUEST 2000 series server.
The MMB provides a dedicated Maintenance LAN port for field engineers. To perform maintenance using the Maintenance Wizard, a field engineer connects an FST (PC used by the field engineer) to the Maintenance LAN port of the MMB of the maintenance target system.

Note

Field engineers perform the maintenance on the PRIMEQUEST 2000 series server.
Below settings are required for maintenance by the field engineers.

- Video redirection and virtual media are available.
  For details on this setting, see '1.3.6 [Console Redirection Setup] window' in "*PRIMEQUEST 2000 series Tool Reference*" (C122-E177).
- Telnet or SSH is available.
  For details on this setting, see '1.5.4 [Network Protocols] window' in "*PRIMEQUEST 2000 series Tool Reference*" (C122-E177).

10.1.3 Maintenance modes

The PRIMEQUEST 2000 series has several maintenance modes.
Only field engineers are allowed to execute operations related to power control such as power off and power on in maintenance mode which can prevent error during this operations. The maintenance modes provide the following advantages:

- They prevent someone other than the field engineer from executing operations related to power control so that the system does not change to unexpected status.
- They prevent error reporting caused by a maintenance error (or maintenance work).

The following table lists the maintenance modes and their functions. Note that Operation mode is the normal operation mode and not a maintenance mode.

TABLE 10.1 Maintenance modes

Mode	Meaning
Operation [Normal operation]	Normal operation
Hot System Maintenance [Active for work (system)]	For maintenance work performed while the system power is on
Hot Partition Maintenance [Active for work (partition)]	For maintenance work performed while the target partition power is on
Warm System Power Off [Partition stopped for maintenance]	For maintenance work performed while the system power is on and the maintenance target partition power is off
Cold System Maintenance (breaker on) [Stopped for work (standby)]	For maintenance work performed while the system power is off and the AC power supply is on
Cold System Maintenance (breaker off) [Stopped for work (AC off)]	For maintenance work performed while the system power is off and the AC power supply is off

TABLE 10.2 Maintenance mode functions

Item		Operation mode	Maintenance mode				
			Hot System	Hot Partition	Warm System	Cold System (breaker on)	Cold System (breaker off)
Power supply operation	Administrator	Permitted	Permitted	Suppressed (*1)	Suppressed (*1)	Suppressed	Suppressed
	Field engineer	Suppressed	Suppressed	Permitted (*1)	Permitted (*1)	Permitted	Permitted
Wake On LAN (WOL)		Permitted	Permitted	Suppressed (*1)	Suppressed (*1)	Suppressed	Suppressed
Calendar function		Permitted	Permitted	Suppressed (*1)	Suppressed (*1)	Suppressed	Suppressed
OS boot		Permitted	Permitted	Suppressed Stops at BIOS (*1)	Suppressed Stops at BIOS (*1)	Suppressed Stops at BIOS (*1)	Suppressed Stops at BIOS
REMCS report		Permitted	Suppressed (*2)	Suppressed (*1)	Suppressed (*1)	Suppressed	Suppressed
DR function		Permitted	Suppressed	Suppressed (*1)	Suppressed (*1)	Suppressed	Suppressed

*1 This pertains only to the maintenance target partition.
*2 Suppresses the REMCS report upon system failure (but reports partition failures).

10.1.4 Maintenance of the MMB

If the server with single MMB fails in MMB, take actions below.

1. Shut down the operating system (LAN) from a remote terminal. (*1)
2. Turn off the chassis AC power.
3. Replace the MMB.
4. Turn on the chassis AC power.

(*1) If you use only port of MMB to login the operating system, it is recommended to duplicate MMB. If MMB fails, you cannot login to the operating system.

Remarks
In a single MMB configuration, hot replacement of the MMB is not possible.

10.1.5 Maintenance of the PCI_BOX (PEXU)

The following concerning maintenance when PCI box (PEXU).

1. The system administrator stops all partitions that belong to the maintenance object.

2. Those who maintain it confirm all partitions that the PCI box belongs have stopped, and exchange PCI boxes (PEXU).

Remarks
It can be confirmed whether all partitions in the PCI box have stopped when Maintenance Wizard is used. Maintenance Wizard is recommended to use and to be exchanged (Only the charge maintenance member uses it).

10.1.6 Maintenance policy/preventive maintenance

For details on the maintenance policy/preventive maintenance for the PRIMEQUEST 2000 series, see 9.1 Maintenance Policy/Preventive Maintenance in the *PRIMEQUEST 2000 Series General Description* (C122-B025EN).

10.1.7 REMCS service overview

REMCS (Remote Customer Support System) connects your server to the REMCS Center through the Internet to enable the system to send server configuration information and automatically report failures when they occur.
REMCS is thus intended to facilitate prompt responses and solutions to problems.
The REMCS function of the PRIMEQUEST 2000 series are implemented by the following components:

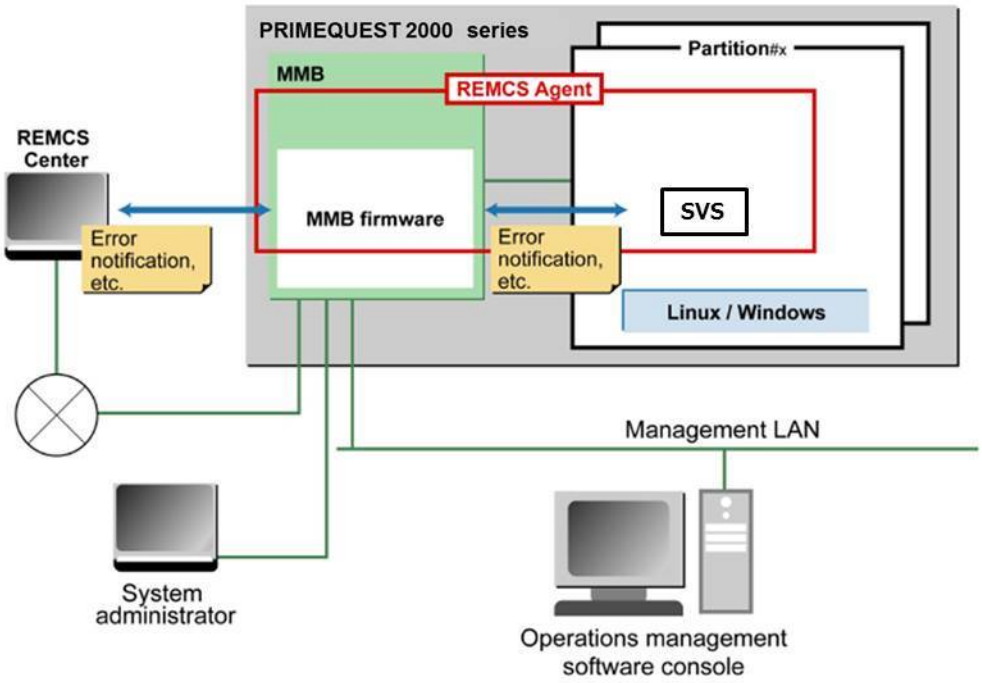
- MMB:
  Collects hardware configuration information of the entire server, monitors the server for problems, and reports thereon to the REMCS Center.
- QSS:
  Collects troubleshooting information when a software failure occurs in a partition.

Communication with the REMCS Center is handled by the MMB. The MMB summarizes the information from each partition and sends it to the REMCS Center.
To receive the REMCS service, contact your sales representative.

10.1.8 REMCS linkage

This function reports resource information or problems in a partition to the REMCS Center in linkage with the MMB.
REMCS Agent reports error information, log information, and other information of the PRIMEQUEST 2000 series system to the REMCS Center via the Internet or P-P connection.
REMCS Agent of the PRIMEQUEST 2000 series consists of the MMB firmware as well as SVS installed in each partition. As the REMCS linkage in the figure shows, the MMB firmware monitors the entire system for problems, and reports them to the REMCS Center when it detects them. SVS notifies the REMCS Center of hardware problem information and hardware configuration information detected by the operating system in the partition via the MMB firmware.
For details on REMCS, see the *PRIMEQUEST 2000 Series REMCS Installation Manual* (C122-E180EN).

FIGURE 10.1 REMCS linkage



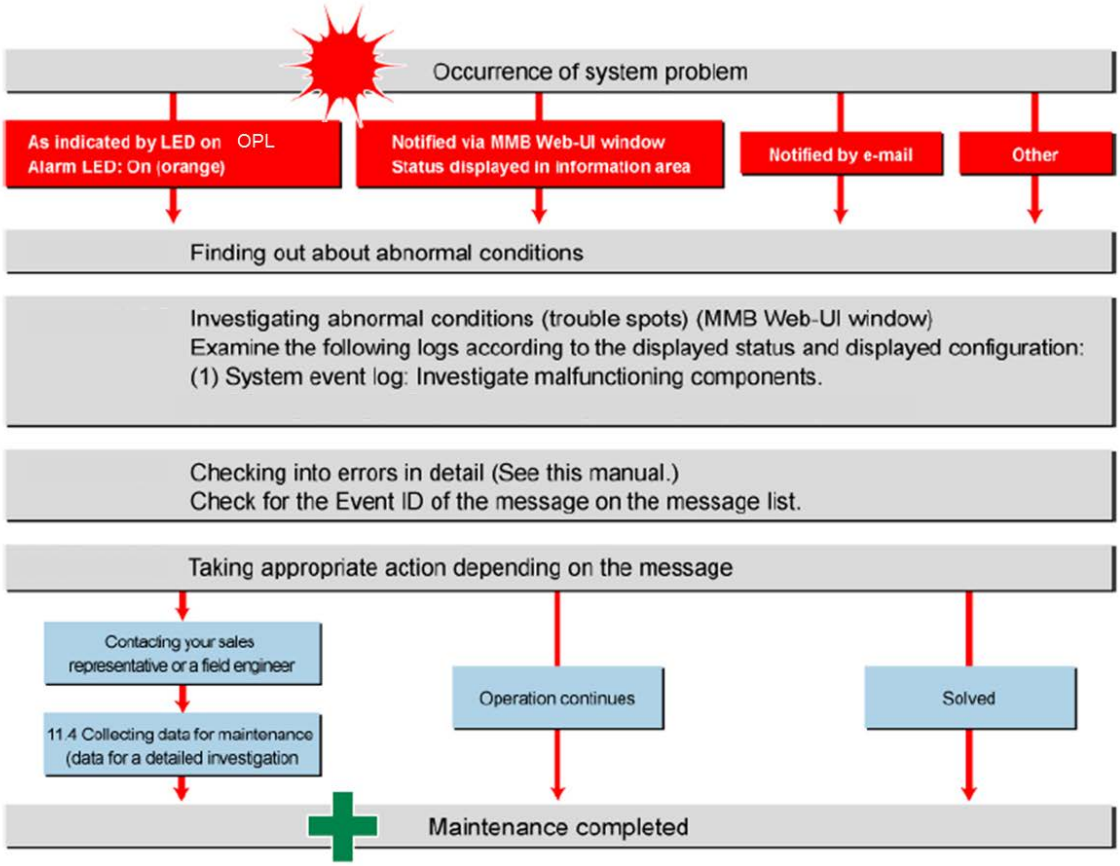
10.2 Troubleshooting

This section describes how to troubleshoot system problems.

10.2.1 Troubleshooting overview

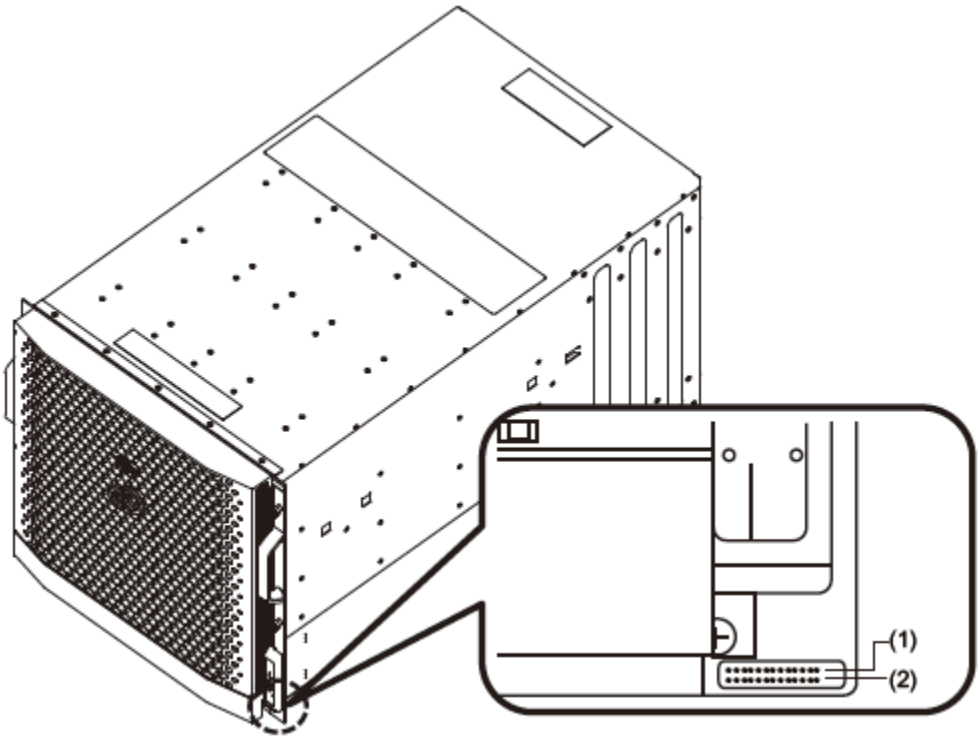
The following shows the basic procedure for troubleshooting.

FIGURE 10.2 Troubleshooting overview


Occurrence of system problem
As indicated by LED on OPL
Alarm LED: On (orange)
Notified via MMB Web-UI window
Status displayed in information area
Notified by e-mail
Other
Finding out about abnormal conditions
Investigating abnormal conditions (trouble spots) (MMB Web-UI window)
Examine the following logs according to the displayed status and displayed configuration:
(1) System event log: Investigate malfunctioning components.
Checking into errors in detail (See this manual.)
Check for the Event ID of the message on the message list.
Taking appropriate action depending on the message
Contacting your sales representative or a field engineer
11.4 Collecting data for maintenance (data for a detailed investgation
Operation continues
Solved
Maintenance completed

If a problem occurs in this product, troubleshoot the problem according to the displayed message.
If the error recurs, contact your sales representative or a field engineer.
Before making contact, confirm the unit, source, part number, event ID, and description of the error as well as the model name and serial number shown on the label affixed to the main unit.

FIGURE 10.3 Label location



No.	Description
(1)	Model name
(2)	Serial number

10.2.2 Items to confirm before contacting a sales representative

Before contacting your sales representative, confirm the following details.
Print the sheet in Appendix L Failure Report Sheet, and enter the necessary information.

- Items to confirm
  Model name and type of the main unit.
  - You can confirm the model name and type with the MMB Web-UI. You can also confirm them from the label affixed to the main unit.
  - Hardware configuration (types and locations of the supplied built-in options)
  - Configuration information (BIOS setup utility settings)
  - OS used
  - LAN/WAN system configuration
  - Symptoms (e.g., what happened at the time, message displayed)
    Sample messages:
    System event log: See FIGURE 10.8 System event log display .
  - Occurrence date and time
  - Server installation environment
  - Status of various lamps

10.2.3 Sales representative (contact)

Contact your sales representative in the following cases:

- For a repair not under any support service contract

- For a repair under warranty during the warranty period
- For a repair not under any support service contract after expiration of the warranty period
  - Our authorized service engineer will repair the product on site. The service engineer will go to your premises on the next business day after the contact date.
  - The service charge (including the technical fee, parts costs, and transportation expenses) for each request depends on the product and work time.
  - Note that some products are outside the service range. Confirm that we will be able to repair your product when you contact us.

10.2.4 Finding out about abnormal conditions

If a problem occurs in the system, use the LEDs on the front of the device, any report on the MMB Web-UI windows, and any e-mail notification to understand the situation. E-mail notification requires settings made in advance.

Remarks

If [Part Number] or [Serial Number] (the content or information area) in the MMB Web-UI window displays "Read Error," contact a field engineer or your sales representative.

Before making contact, confirm the model name and serial number shown on the label affixed to the main unit.

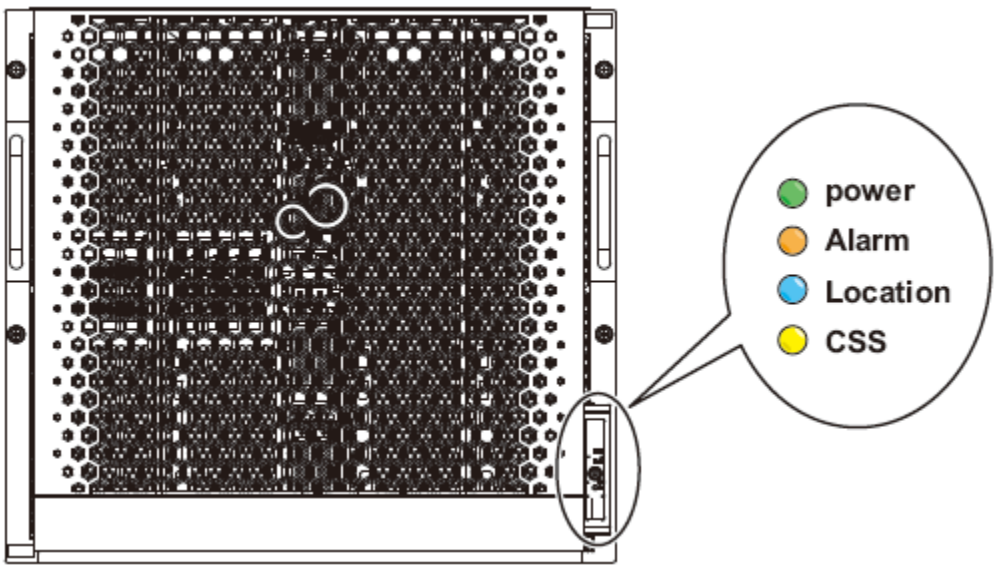
LED display

The following figure shows the LEDs located on the front panel of the device. The Alarm LED indicates a problem inside the device.

If a problem occurs inside the device, the Alarm LED goes on (orange).

The Alarm LED stays off when the device is operating normally.

FIGURE 10.4 Alarm LED on the front panel of the device



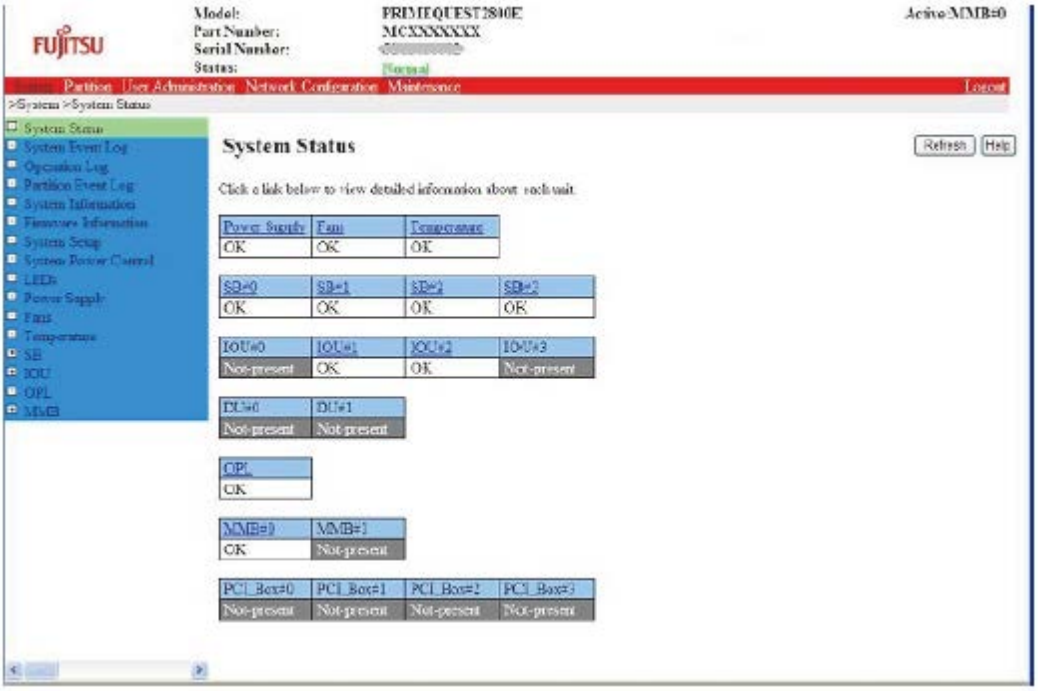
As long as a problem remains inside the device, the Alarm LED is on. This indication does not change even if multiple problems have occurred.

Note that the front panel of the device also has the MMB-Ready LED. The MMB-Ready LED stays on in green when the device is operating normally. To start the MMB, select [System] - [MMB] on the Web-UI when the MMB-Ready LED is off. Select [Enable] in [Enable/Disable MMB] in the [MMB] window. Then, click the [Apply] button.

MMB Web-UI window

As shown in the following figure, you can use the MMB Web-UI window to check for any problems.

FIGURE 10.5 System status display in the MMB Web-UI window



No.	Description
Status in information area	Displays the system status

The MMB Web-UI window always displays the information area. [Status] in the information area displays the system status. The following table lists the Normal, Warning, and Error status indicators. You can view the details of a message about a trouble spot by clicking the displayed icon to jump to the [System Event Log] window.

TABLE 10.3 Icons indicating the system status

Status	Display color	Icon	
Normal (normal status)	Green	None	
Warning (warning status)	Yellow		A black! mark in a yellow triangle
Error (critical status)	Red		A white x mark in a red circle

Remarks
If [Part Number] or [Serial Number] (the content or information area) in the MMB Web-UI window displays "Read Error," contact a field engineer or your sales representative.
Before making contact, confirm the model name and serial number shown on the label affixed to the main unit.

Alarm E-Mail notification

Alarm E-Mail notification can inform you of system problems.
You can configure Alarm E-Mail notification for problem occurrences by selecting [Network Configuration] - [Alarm E-Mail] from the MMB menu.
You can also filter the notification, such as by error status type, partition, or target component.

FIGURE 10.6 Alarm E-Mail settings window

Miscellaneous

Problems related to system startup or drivers may occur.
For details on these problems, see the *PRIMEQUEST 2000 Series Message Reference* (C122-E178EN).
If the status is one of the MMB error or warning statuses listed in the following operation interrupt criteria, stop the system and contact a field engineer or your sales representative.
Before making contact, confirm the model name and serial number shown on the label affixed to the main unit.

- Operation interrupt criteria
  - The Alarm LED of the MMB is on.
  - The Active LEDs of MMB#0 and MMB#1 are both off.
  - You cannot connect to the MMB Web-UI.
  - The Alarm LEDs of multiple boards in the device are on.
  - The MMB Web-UI displays [Read Error].
  - The [System Status] window of the MMB Web-UI displays [Not Present] for the status of every unit.

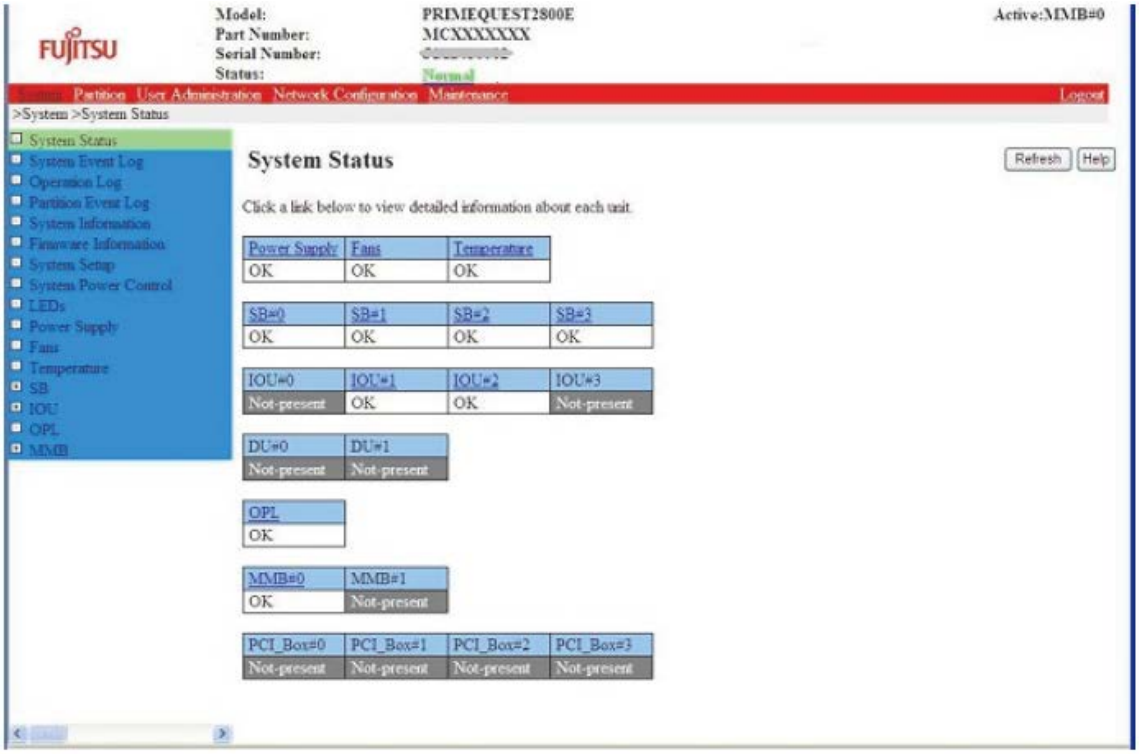
10.2.5 Investigating abnormal conditions

Investigate trouble spots. First, check the component (e.g., SB, IOU) and the partition where the problem occurred.
The corrective action varies depending on various factors, including the location of the trouble spot, error level, and the system operation mode.

Finding out about a faulty component

Investigate the entire system component configuration and the faulty component.
Select [System] - [System Status] in the [MMB] menu window to display the window shown in the following figure.
You can find out the status of each component.

FIGURE 10.7 System status display



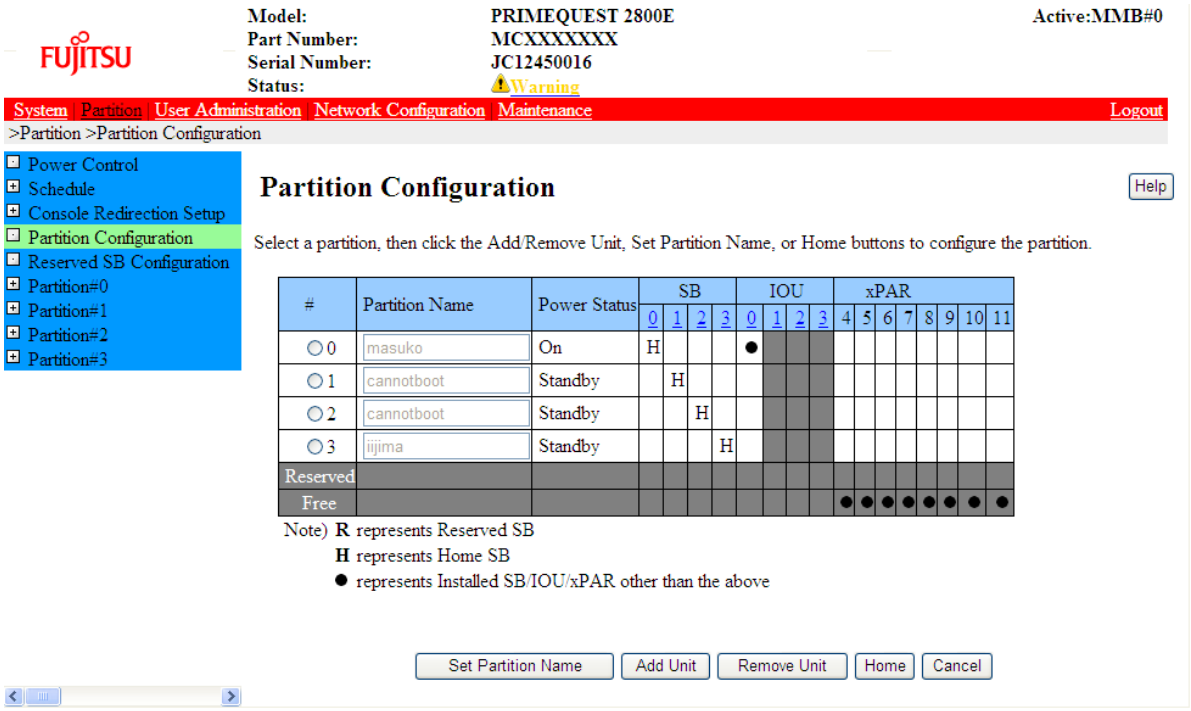
Click the icon displayed for an existing trouble spot to display a window showing the component status. If [Part Number] or [Serial Number] (the content or information area) in the MMB Web-UI window displays "Read Error," contact a field engineer or your sales representative.
You can view the component status and system event log (SEL) contents by selecting [System] - [System Event Log] to open the [System Event Log] window.
The SEL information is important for an investigation, so first click the [Download] button at the bottom of the window to save the information. The information will be needed when you contact a field engineer or your sales representative.
For details on how to read system event log messages, see Chapter 1 Message Overview in the *PRIMEQUEST 2000 Series Message Reference* (C122-E178EN).

FIGURE 10.8 System event log display

Finding out about a faulty partition

Investigate the entire system partition configuration and the faulty partition in PRIMEQUEST 2400E and 2800E.
Select [Partition] - [Partition Configuration] in the [MMB] menu window. You can find out the status of each partition.

FIGURE 10.9 [Partition Configuration] window



Finding out the partition error status

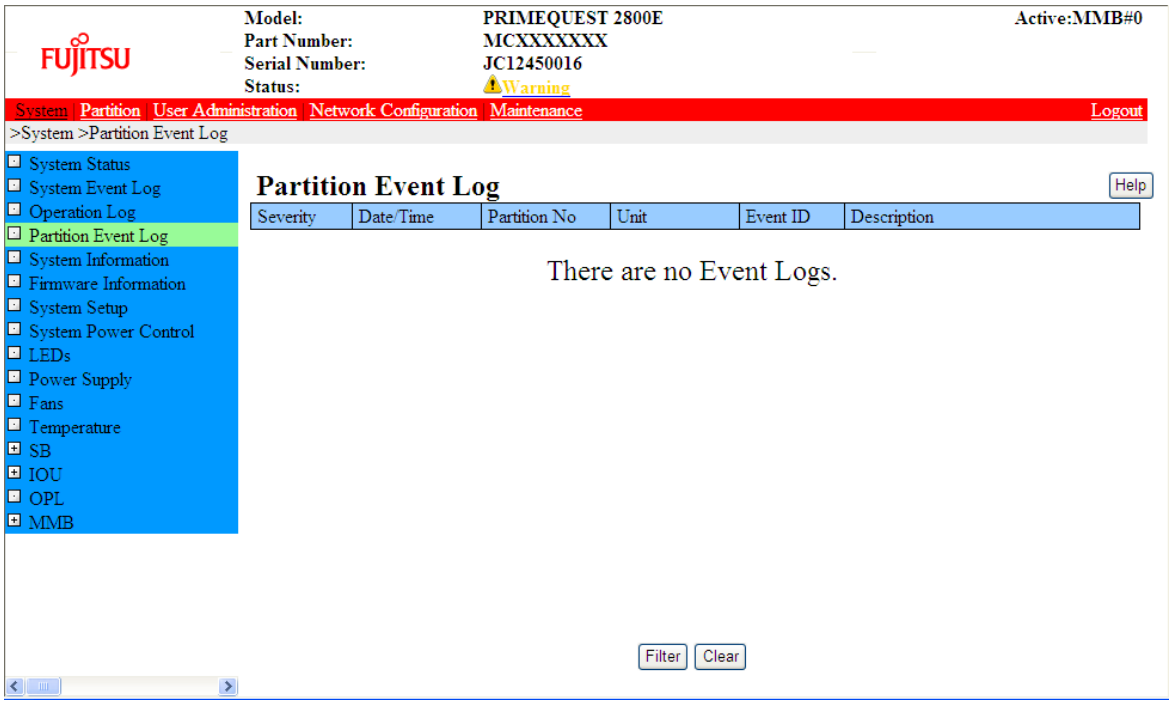
Examine the partition error status in PRIMEQUEST 2400E and 2800E.
Select [System] - [Partition Event Log] in the [MMB] menu window.

On the [Partition Event Log] window, you can find out about problems in the partition from the displayed log.
For details on how to read agent log messages, see Chapter 3 PSA Messages in the *PRIMEQUEST 2000 Series Message Reference* (C122-E178EN).
The *Message Reference* lists the meanings of messages and corrective actions in order of event IDs. The [Partition Event Log] or the [Agent Log] window lists event IDs and message details to inform you of problems.

Remarks

For VMware 5, Seg:Bus:Dev.Func is displayed for [Unit] on the [Partition Event Log] window (Example: 0:0:25.0).
For details on the method of identifying the Unit in this case, contact the distributor where you purchased your product, or your sales representative.

FIGURE 10.10 [Partition Event Log] window



10.2.6 Checking into errors in detail

Check the details of messages to take appropriate action.
According to the message ID in the displayed log, check the message details in the list of messages in the *PRIMEQUEST 2000 Series Message Reference* (C122-E178EN). Then, take appropriate action.

- System event messages detected by the MMB: Chapter 2 MMB Messages in the *PRIMEQUEST 2000 Series Message Reference* (C122-E178EN)
- Messages detected by the partition: Chapter 3 sadump Messages in the *PRIMEQUEST 2000 Series Message Reference* (C122-E178EN)

Remarks

- Be sure to write down the message ID and message details because they will be needed when you contact a field engineer or your sales representative.
- If the list of messages in the *PRIMEQUEST 2000 Series Message Reference* (C122-E178EN) does not include the displayed message, contact a field engineer or your sales representative.

10.2.7 Problems related to the main unit or a PCI_Box

This section describes problems related to the main unit or a PCI_Box. It also describes how to correct the problems.

An LED on the main unit does not go on, or the orange LED is on.

- Cause: The main unit may have failed.
  Corrective action: Contact your sales representative or a field engineer. Before making contact, confirm the model name and serial number shown on the label affixed to the main unit.

An error message appears on your display.

- Cause: An error occurred in the device.
  Corrective action: Confirm the error message, and take action according to the description of the error.

The keyboard and mouse do not work.

- Cause: The cables are not correctly connected to the USB ports of the Home SB.
  Corrective action: Connect the cables correctly to the USB ports of the Home SB.

[Part Number] or [Serial Number] in the MMB Web-UI displays [Read Error].

- Cause: A failure occurred and prevents the part or serial numbers from being read.
  Corrective action: Contact your sales representative or a field engineer. Do not execute [Reset] or [Force Power Off] on the partition until the problem is solved. Before making contact, confirm the model name and serial number shown on the label affixed to the main unit.

10.2.8 MMB-related problems

This section describes MMB-related problems and how to correct the problems.

No connection to the PRIMEQUEST 2000 series server can be established using the Web-UI.

- Cause 1: The setting of the IP address, subnet mask, or gateway is wrong.
  Corrective action: Referring to 3.3.3 Setting up the connection environment for actual operation in the *PRIMEQUEST 2000 Series Installation Manual* (C122-E174EN), set the correct value.
- Cause 2: A failure occurred in the network between the MMB console PC and the MMB USER port.
  Corrective action: Replace the faulty network device or LAN cable.
- Cause 3: A problem occurred in the internal network (e.g., internal hub) of the MMB.
  Corrective action: Switch the active MMB by using the following procedure:
  1. Log in to the standby MMB via telnet/ssh.
  2. Execute the set active_mmb command to switch the active MMB. For details on the set active_mmb command, see 2.2.12 set active_mmb in the *PRIMEQUEST 2000 Series Tool Reference* (C122-E110EN).

The MMB windows do not appear.

- Cause 1: The MMB LAN port is not enabled.
  Corrective action: Enable the LAN port.
- Cause 2: The MMB console PC is not correctly connected to the MMB USER port.
  Corrective action: Connect them correctly.
- Cause 3: The browser version is not supported.
  Corrective action: The MMB supports the following browsers:
  - Microsoft Internet Explorer version 8 or later
  - Mozilla FireFox version 20 or later
- Cause 4: JavaScript is not enabled in the browser.
  Corrective action: The MMB Web-UI uses JavaScript. Enable JavaScript in the browser.

10.2.9 Problems with partition operations

- [Status] in the information area of the MMB Web-UI changes to "Error" when [Power Off], [Reset], or [Force Power Off] is executed on the partition or when the partition is shut down from the operating system. Also, the MMB Web-UI displays [Read Error] in [Part Number] and [Serial Number] of each component.
- Cause: Hardware may have failed.
  Corrective action: Contact your sales representative or a field engineer. Do not execute [Reset] or [Force Power Off] on the partition until the problem is solved. Before making contact, confirm the model name and serial number shown on the label affixed to the main unit.
- During the partition power-on sequence from the beginning of power-on until execution of the reset process, if another partition is powered on in a scheduled operation, the booting of the partition powered on earlier may not complete.
- Cause: An MMB firmware restriction causes this problem.
  Corrective action: Execute [Force Power Off] on the partition causing the problem, and execute [Power On] again.

10.3 Notes on Troubleshooting

This section provides notes on troubleshooting.

- In the PRIMEQUEST 2000 series, if you unplug all the AC power cables while the device is in standby mode, the system event log records AC Lost (Severity: Info). This is neither a problem nor a failure. It is a normal situation.
  The following example shows this type of message.

(Item): Severity Unit Source EventID Description
--------- : ----------
(Display): Info PSU#*** ******** Power Supply input lost during the cabinet power off

10.4 Collecting Maintenance Data

System problems include cases where the partition abnormally stops and cases where the partition is running but hangs. In all such cases, you need to collect data for investigation to troubleshoot the problem.
Be sure to configure the memory dump before starting to use the PRIMEQUEST 2000 series server. Fujitsu uses this information to identify the cause of the system problem and solve it quickly.

TABLE 10.4 System problems and memory dump collection

System status	Memory dump collection	See
Partition stopped abnormally	A memory dump for the partition has already been collected.	10.4.2 Collecting data for investigation (Windows) 10.4.3 Setting up the dump environment (Windows)
Partition hung up, not stopped	Acquire memory dump by sadump	10.4.1 Logs that can be collected by the MMB

10.4.1 Logs that can be collected by the MMB

The MMB Web-UI can collect the events that occur in the PRIMEQUEST 2000 series system.
The SEL (system event log) can hold up to 32,000 events. When the SEL is full, each new entry will replace the oldest entry in the SEL.
You can filter the event logs to display, download event log stored in the SEL, and clear all the stored event logs in the SEL from the [System Event Log] window.
This section describes operations with the SEL.

Checking the event log

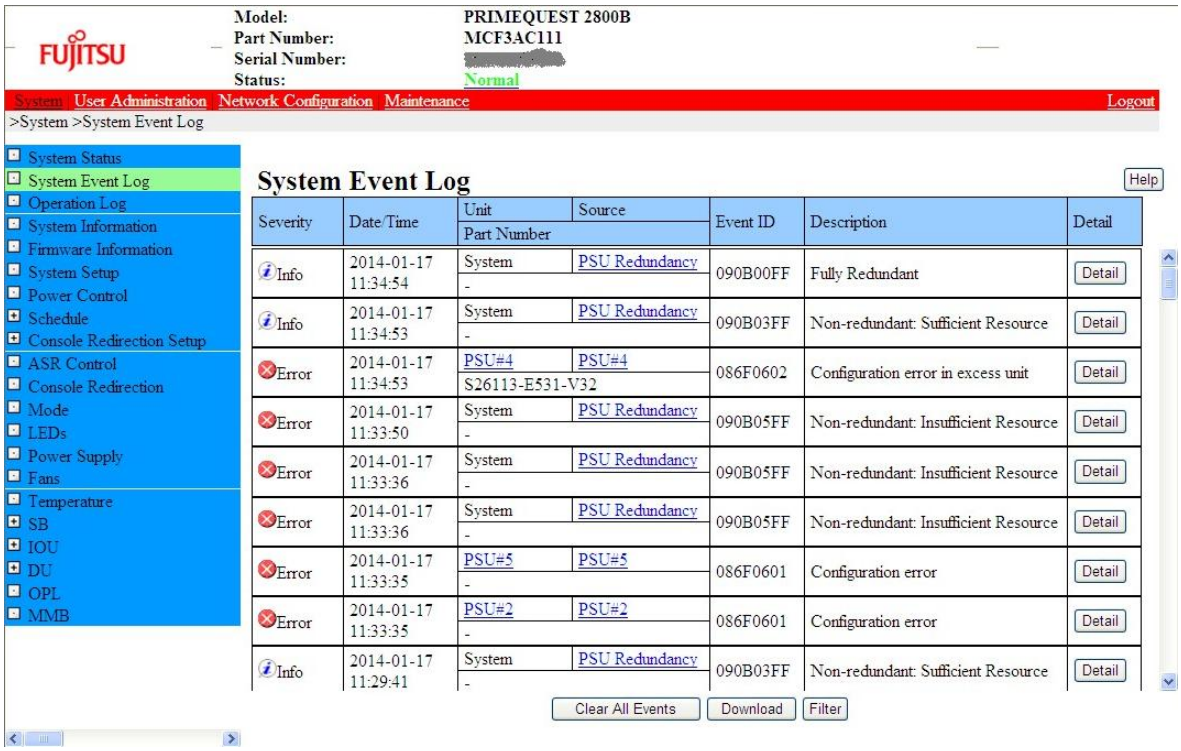
Procedure

1. Click [System] - [System Event Log].
   The [System Event Log] window appears.

FIGURE 10.11 [System Event Log] window in PRIMEQUEST 2400E and 2800E

Model: PRIMEQUEST2800E
Part Number: MCXXXXXXX
Serial Number:
Status: Normal
Active:MMB#0
Partition User Administration Network Configuration Maintenance Logout
>System >System Event Log
System Status
System Event Log
Operation Log
Partition Event Log
System Information
Firmware Information
System Setup
System Power Control
LEDs
Power Supply
Fans
Temperature
SB
IOU
OPL
MMB
System Event Log
Help
Severity
Date/Time
Unit
Source
Part Number
Event ID
Description
Detail
Info 2013-04-12 14:50:31 Partition#2 P#2 Sys Status - C06F00FF Power Off Detail
Info 2013-04-12 14:49:48 Partition#2 P#2 Sys Status - C06F08FF Power Off In Progress Detail
Info 2013-04-12 14:47:07 Partition#2 P#2 Sys Status - C06F03FF POST Detail
Info 2013-04-12 14:47:05 Partition#2 P#2 Sys Status - C06F03FF POST Detail
Info 2013-04-12 14:47:03 Partition#2 P#2 Sys Status - C06F02FF Reset Detail
Info 2013-04-12 14:46:42 Partition#2 P#2 Sys Status - C06F01FF Power On In Progress Detail
Info 2013-04-12 14:28:00 Partition#2 P#2 Sys Status - C06F00FF Power Off Detail
Info 2013-04-12 14:27:17 Partition#2 P#2 Sys Status - C06F08FF Power Off In Progress Detail
Info 2013-04-12 14:26:38 Partition#2 P#2 Sys Status - C06F03FF POST Detail
Info 2013-04-12 14:26:36 Partition#2 P#2 Sys Status - C06F03FF POST Detail
Clear All Events
Download
Filter

FIGURE 10.12 [System Event log] window in PRIMEQUEST 2800B



2. Confirm the displayed contents.
   Click the [Download] button to download the event data stored in the SEL. Alternatively, click the [Filter] button to filter the events to display.
   Click the [Detail] button of an event to display details of the event. Click the [Cancel] button to clear settings and restore their previous values.
   Note

Be sure to check with a field engineer before clearing events stored in the SEL.

Remarks

- If a problem occurs during operation, e-mail notification is sent. For details on how to specify whether to use e-mail notification and how to set the error level and e-mail destination for e-mail notification, see 1.5.11 [Alarm E-Mail] window in the *PRIMEQUEST 2000 Series Tool Reference* (C122-E177EN).
- For an explanation of display items in the [System Event Log] window, see 1.2.2 [System Event Log] window in the *PRIMEQUEST 2000 Series Tool Reference* (C122-E177EN).
- To get the log of RAID card by downloading SEL, it is required that the partition mounting the particular RAID card is power on state.

Downloading the event data stored in the SEL

A Fujitsu certified service engineer needs the event data stored in the SEL to analyze the system status. Therefore, we may ask you to download the event data and submit it to a Fujitsu certified service engineer.

Procedure

1. Click the [Download] button in the [System Event Log] window.
   A dialog box for specifying the storage file and path appears.
2. Enter the pathname.
   The event data stored in the SEL is downloaded to the PC displaying the [Web-UI] window.

Filtering the events to display

Procedure

1. Click the [Filter] button in the [System Event Log] window.
   The [System Event Log Filtering Condition] window appears.

FIGURE 10.13 [System Event Log Filtering Condition] window in PRIMEQUEST 2400E and 2800E

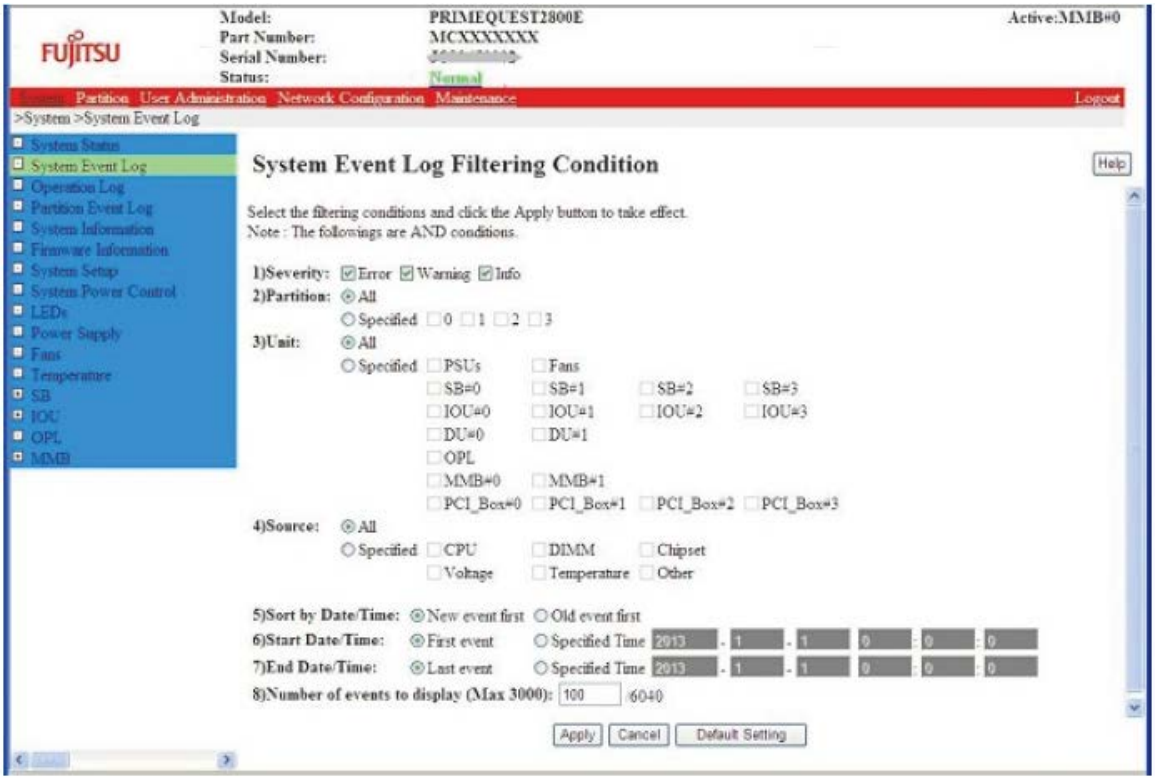
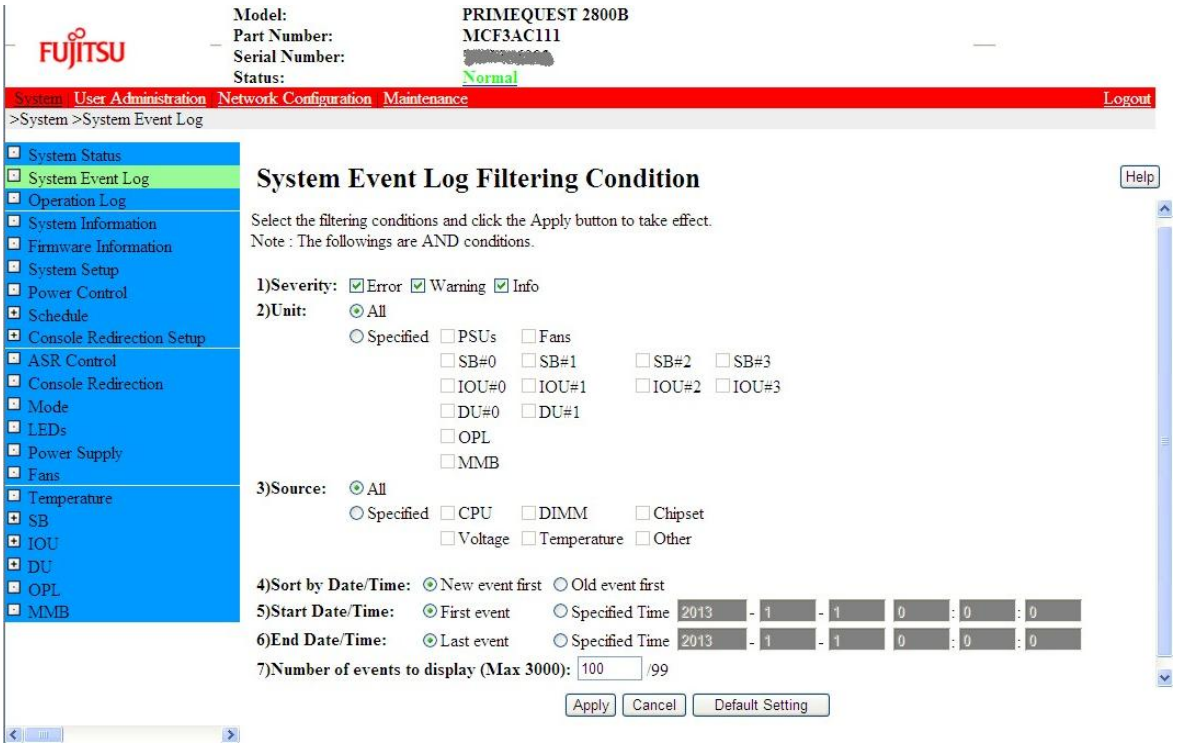


FIGURE 10.14 [System Event Log Filtering Condition] window in PRIMEQUEST 2800B



2. Specify the condition to filter events. Then, click the [Apply] button.
   The [System Event Log] window appears again. The window displays the events matching the specified conditions.
   To clear the specified conditions and return to the [System Event Log] window, click the [Cancel] button.
   To clear the specified conditions and restore the default values, click the [Default Setting] button.

TABLE 10.5 Setting and display items in the [System Event Log Filtering Condition] window

Item	Description
Severity	Select the severity of events to display by using the following check boxes. You can check multiple check boxes. - Error - Warning - Info All check boxes are checked by default.
Partition (*1)	Select the partition to display. Select the [All] or [Specified] radio button. If you select [All], filtering by partition will not be applied. In this case, the check boxes for partitions in [Specified] are grayed out and cannot be checked. If you select [Specified], you can check the check boxes for selecting a partition. Even after a switch to [All] and back to [Specified], the window retains the selections made with the [Specified] check boxes [All] is grayed out and cannot be selected for users with Partition Operator accounts. Also, they can select partition filtering only for the target partition. The default settings are as follows: - For other than Partition Operator, [All] radio button. - For Partition Operator, [Specified] radio button and target partition.
Unit	Select the units to display. Select the [All] or [Specified] radio button. If you select [All], filtering by unit is not applied. If you select [Specified], you can set filtering by unit. Check the check box of a unit to display the events of that unit. Even after a switch to [All] and back to [Specified], the window retains the selections made with the [Specified] check boxes.

Item	Description
	The default is [All].
Sort by Date/Time	Select ascending or descending order for displaying events by using the radio buttons. The default is [New event first].
Start Date/Time	Select the first event or an event of the specified time by using the radio buttons. If you select [Specified Time], you can enter the start time. Even after a switch to [First Event] and back to [Specified Time], the window retains the time data entered in [Specified Time]. The default is [First event]. The default for [Specified Time] is 2013/01/01 00:00:00.
End Date/Time	Select the last event or an event of the specified time by using the radio buttons. If you select [Specified Time], you can enter the last time. Even after a switch to [Last Event] and back to [Specified Time], the window retains the time data entered in [Specified Time]. The default is [Last event]. The default for [Specified Time] is 2013/01/01 00:00:00.
Number of events to display	Specify the number of events to display. The denominator represents the total number of events logged. The specifiable maximum value is 3000. The default is 100.

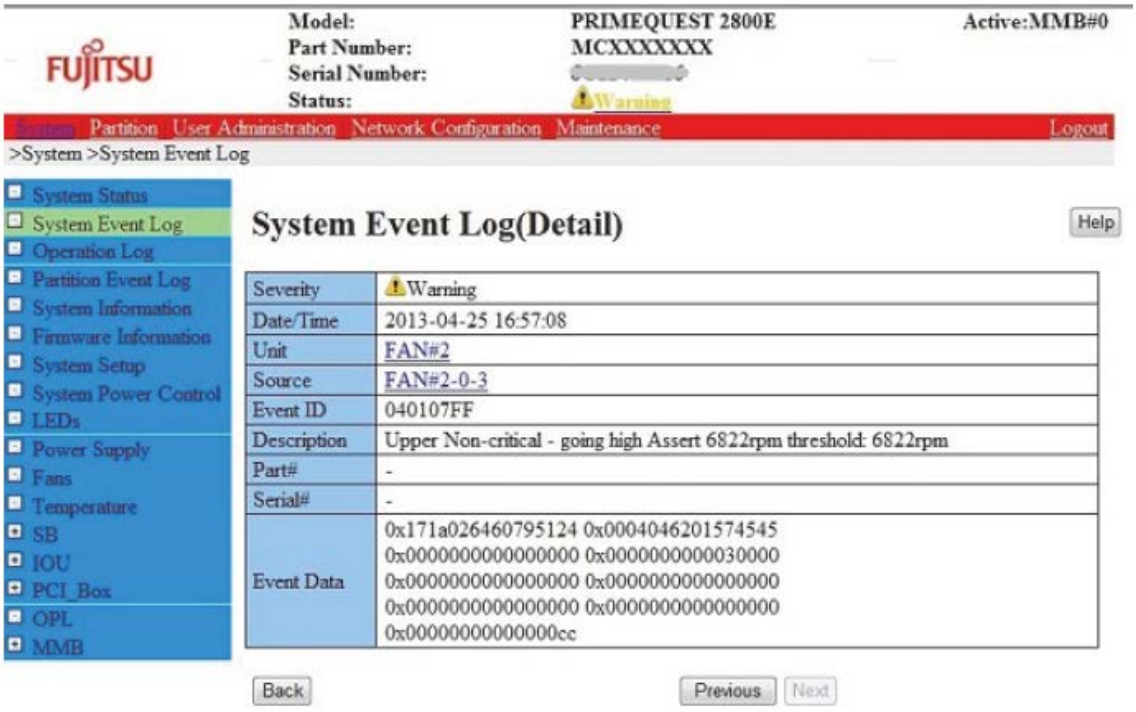
*1: The item of Partition is displayed in PRIMEQUEST 2400E and 2800E. It is not displayed in PRIMEQUEST 2800B.

Displaying details of an event

Procedure

1. Click the [Detail] button of the event to display its details.
   The [System Event Log (Detail)] window appears.

FIGURE 10.15 [System Event Log (Detail)] window



2. Click the button of the chosen operation.
   [Back] button: The display returns to the [System Event Log] window.
   [Previous] button: The window displays the previous event according to the display order in the [System Event Log] window. Note that the order of events displayed in the [System Event Log] window is not the actual order of stored events in the SEL.

[Next] button: The window displays the next event according to the display order in the [System Event Log] window.

TABLE 10.6 Setting and display items in the [System Event Log (Detail)] window

Item	Description
Severity	Displays the severity of the event or error. - Error: Serious problem such as a hardware failure - Warning: Event that is not necessarily serious but is a potential problem in the future - Info: Event such as a partition power-on, reported for informational purposes
Date/Time	Displays the local time of occurrence of the event or error. Format: YYYY-MM-DD HH:MM:SS
Source	Displays the name of the sensor indicating the occurrence of the event or error.
Unit	Displays the unit whose sensor indicated the occurrence of an event or error. For example, if an error occurs at CPU#0 on SB#0, this item will display "SB#0." To identify the unit, the FRU in control of the sensor was identified from the event ID of the sensor. Then, the associated parent entry was retrieved from the Entity Association Record. The displayed name is the Board/Unit Name written in the FRU Record of the parent entry. Each unit has a link to a webpage for information on the unit. (You can see the part number and serial number of the unit there.)
Event ID	Displays the ID (8-digit hexadecimal value) that identifies the event details. For details on Event ID assignment, see Chapter 2 MMB Messages in the PRIMEQUEST 2000 Series Message Reference (C122-E178EN).
Description	Displays the details of the event or error. If the sensor recorded data other than Trig Offset in Event Data, this item also displays that Event Data. For example, the R and T values recorded by the sensor are displayed as the Reading Value and Threshold Value at the event occurrence time. However, for an event related to the mounting or removal of a board, this item displays the part number and serial number of the board.
Part#	Displays the Part# value stored in the SEL. If no Part# value is stored, this item displays "-".
Serial#	Displays the serial number of the component where the event occurred.
Event Data	Displays [Event Data] values in hexadecimal.

10.4.2 Collecting data for investigation (Windows)

If a problem occurs in Windows, data on the situation is required for ensuring a prompt and correct investigation.
This section describes frequently required investigation data and how to acquire the data.

Software Support Guide and DSNAP

SSG and DSNAP are support tools for collecting the data necessary for investigation of software problems. If a problem occurs in your system, SSG and DSNAP enable your Fujitsu certified service engineer to correctly determine the system software configuration. This leads to a smooth investigation. (The engineer uses this information to determine how the system is configured and deployed. It includes a list of installed software programs, operating system settings, and event logs.)
SSG and DSNAP are executed from the administrator command prompt.
For details on how to use them, see the following references:
DSNAP: README_JP.TXT file in the *operating system installation drive*:¥DSNAP folder
SSG (QSS acquisition tool): Help for SSG

Memory dump

A memory dump is an exact copy of the memory contents at time of occurrence of a problem. A memory dump is very useful in following cases.

- The desktop screen is frozen.
  Windows itself hangs during system operation. (For example, the desktop screen freezes, or you cannot operate the mouse or keyboard.)

- The responsiveness of the mouse or keyboard is too slow.
  Performance deteriorates during system operation when the responsiveness of the mouse or keyboard is too slow.

For details on memory dump file settings, see 10.4.3 Setting up the dump environment (Windows).
To acquire memory dump, select [Partition] and then the [Power Control] window of the MMB Web-UI.
Specify [NMI] for the target partition.
Remarks

- Forced acquisition of a memory dump causes the server to stop.
- Collection of a memory dump may take a long time depending on the environment.

10.4.3 Setting up the dump environment (Windows)

Memory dump is a standard operating system function in Windows. However, before you can acquire dumps, you need to allocate an area for them on the disk.
This section describes how to set up the environment to acquire memory dumps in Windows. To ensure system recovery from a failure, configure the following to set up the memory dump environment before starting to use memory dumps:

Memory dump files and paging files

Memory dump and paging files are described below.
A memory dump file stores debug information on a STOP error (fatal system error) that occurred in the system.
After installing the operating system and applications for operations, make settings for acquiring memory dumps.

Different information collected by a memory dump

The PRIMEQUEST 2000 series enables you to acquire the following four types of memory dump. Each type of memory dump gathers different information.

- Complete memory dump
  A complete memory dump records all the physical memory contents at the time when the system stops. It requires free space equivalent to the physical memory size plus about 300 MB on the boot volume. The system can store only one dump at a time. The new file would overwrite any existing dump file at the specified storage location.
- Kernel memory dump
  A kernel memory dump records the contents of the Kernel memory space only. For 32 bit windows, dump file of up to 2GB is created. For 64 bit windows, dump file of up to 8TB is created. The size varies depending on the situation. The system can store only one dump at a time. The new file will overwrite an existing dump file at the specified storage location.
- Minimum memory dump
  A minimum memory dump records the minimum required data to identify the problem. It requires 128 or 256KB of free space. With this option, the dump function creates a new file each time the system stops unexpectedly.
- Automatic memory dump
  This type of dump is available beginning with Windows Server 2012. "Automatic memory dump" is the default setting in Windows Server 2012. An automatic memory dump records the same information as a kernel memory dump. It differs from a kernel memory dump as follows.
  - The default setting of the paging file size is a smaller value.
  - If all kernel space information could not be recorded, the paging file size is automatically expanded at the next start time. However, if all kernel space information could not be recorded, memory dump acquisition may fail.

TABLE 10.7 Memory dump types and sizes

Memory dump type	Memory dump file size	
Complete memory dump	Physical memory size + 300 MB (*1)	Overwrite (*2)
Kernel memory dump	Depends on memory space during system operation (32bit windows:max 2 GB, 64bit windows max 8 TB).	Overwrite (*2)

Memory dump type	Memory dump file size	
Minimum memory dump	32bit windows: 128 KB 64bit windows: 256 KB	Create new file
Automatic memory dump	Depends on memory space during system operation (max 8TB).	Overwrite (*2)

*1 In a system using the Memory Mirror function, it is half the size of the mounted physical memory
*2 The existing file is overwritten by default. You can change this setting to not overwrite the dump file. However, unlike the minimum memory dump, no new dump file would be created in such cases.

Notes

- Be sure to reserve enough free space on the HDD/SSD before acquiring a memory dump.
- Select the optimum settings for system operation by taking the following into account:
  - The causes of some problems may not be identified because kernel memory dumps do not record user mode information.
  - The time taken to create a complete memory dump is proportional to the memory size, and the down time before a system restart is longer. Also, the saved dump file requires freer disk space.
  - The memory dump file cannot be stored in the iSCSI connection destination. However, only when the paging file is arranged on the iSCSI boot disk, it is possible to store it in booting it iSCSI.

Memory dump configuration methods

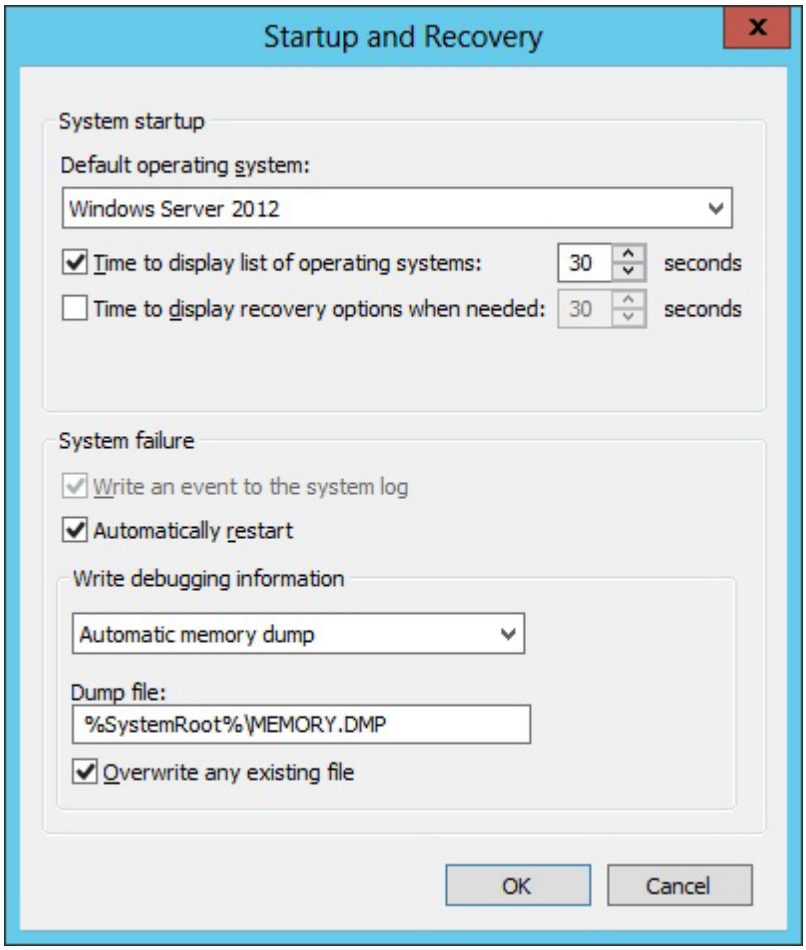
The methods of configuring memory dumps are described below.

<For Windows Server 2012 or Windows Server 2012R2>

Configure the memory dump file in the following procedure.

1. Log in to the server with Administrator privileges.
2. Confirm the free space on the drive to store the memory dump file.
3. Click [Control Panel] - [System and Security] - [System] - [Advanced system settings].
4. Click [Settings] under [Startup and Recovery] on the [Advanced] tab.
   The [Startup and Recovery] dialog box appears.

FIGURE 10.16 [Startup and Recovery] dialog box



5. Specify the following values.
   Select the type of memory dump file from [Write debugging information]. Set the dump file storage location in [Dump file].
6. Click the [OK] button to close the [Startup and Recovery] dialog box.
7. Click the [OK] button to close the [System Properties] dialog box.
8. Restart the partition.
   After the partition restart, the settings take effect. Then, make the following settings.

Configuring a complete memory dump of Windows Server 2008 R2

The dump of a complete memory of Windows Server 2008 R2 cannot be set from the start and the recovery dialog boxes of the system. After it sets the dump file preservation ahead in the start and the recovery dialog boxes, the value of the registry is changed as follows.

HKEY_LOCAL_MACHINE¥System¥CurrentControlSet¥Control¥CrashControl "CrashDumpEnabled" (Kind: REG_DWORD and data: 0x1)

Please reboot a system after the setting. Please refer to above-mentioned "Memory dump configuration methods of Windows Server 2012" for the preservation passing of the dump file and the setting of the superscription.

Confirming the memory dump configuration

Acquire a memory dump. Confirm that dump was created correctly. Also, measure the time taken to output the dump and restart the system so as to estimate the time required until business could resume. Then, reconsider the type of dump to acquire, as needed.
To acquire a memory dump, select [Partition] and then the [Power Control] window of the MMB Web-UI. Then, specify [NMI] for the target partition.

For details on the procedure, see Chapter 1 MMB Web-UI (Web User Interface) Operations in the *PRIMEQUEST 2000 Series Tool Reference* (C122-E177EN).

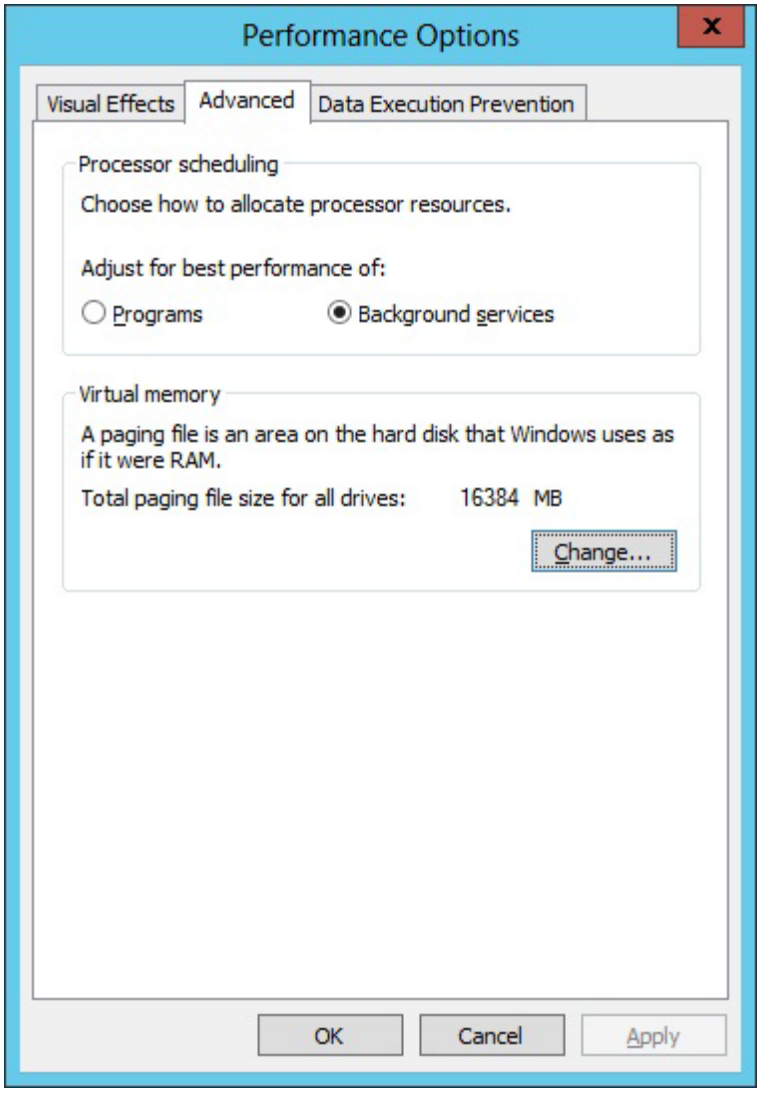
Configuring the paging file

<For Windows Server 2012 or Windows Server 2012R2>

Configure the paging file in the following procedure.

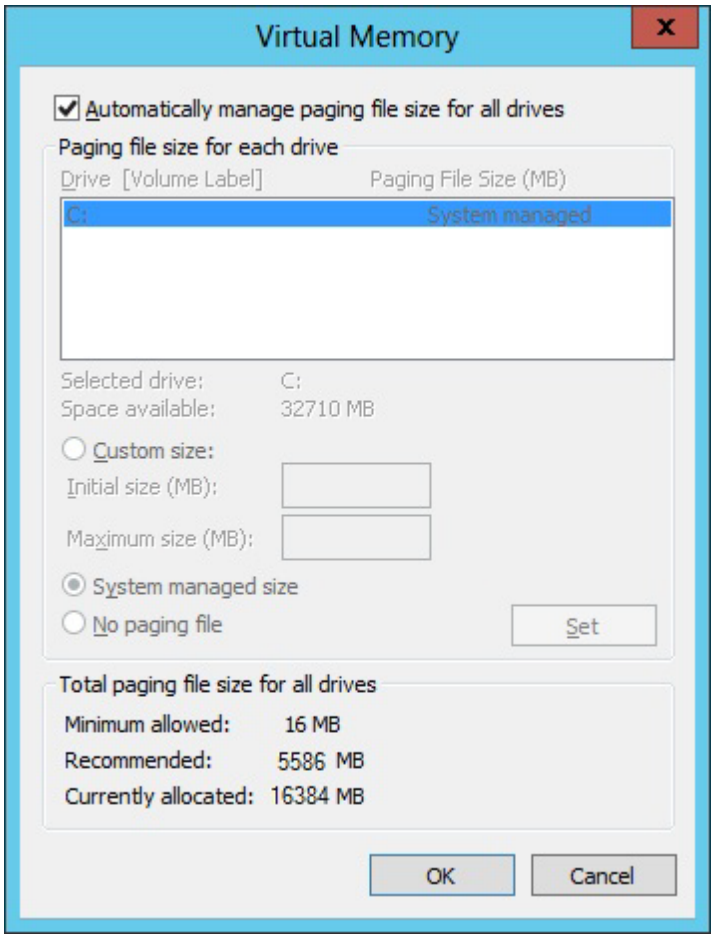
1. Log in to the server with Administrator privileges.
2. Click [Control Panel] - [System and Security] - [System] - [Advanced system settings].
3. Click [Settings] under [Performance] on the [Advanced] tab.
   The [Performance Options] dialog box appears.
4. Click the [Advanced] tab.

FIGURE 10.17 [Advanced] tab of the dialog box



5. Click [Change] under [Virtual memory].
   The [Virtual Memory] dialog box appears.

FIGURE 10.18 [Virtual Memory] dialog box



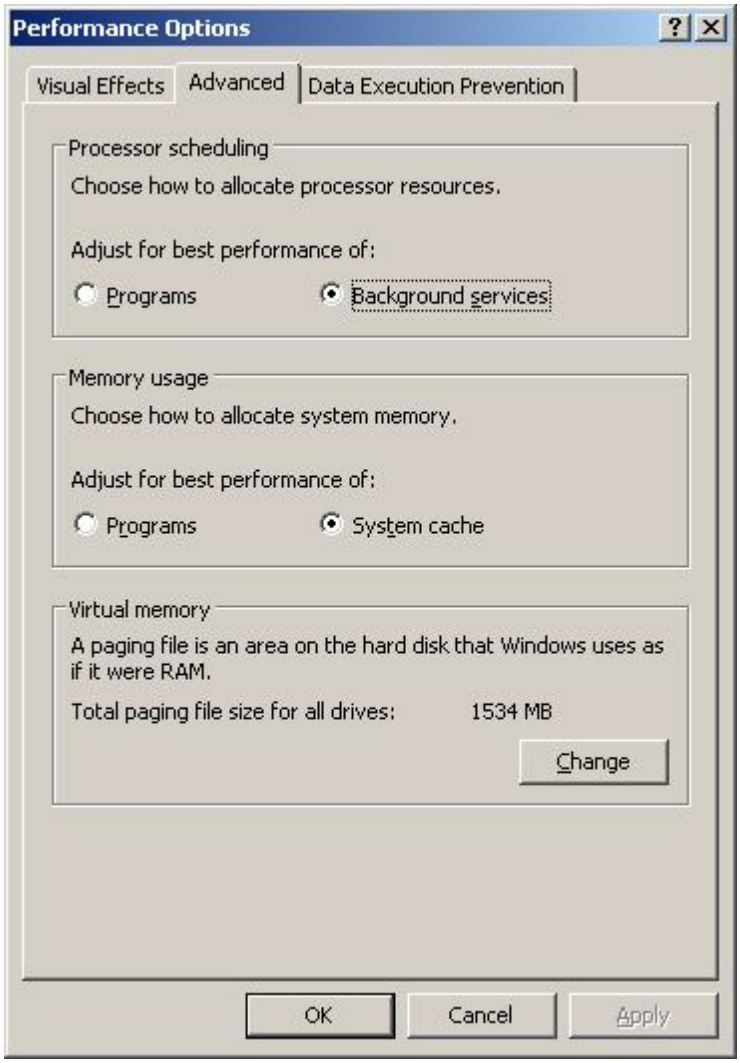
6. Uncheck [Automatically manage paging file size for all drives]. [Drive] specifies the drives on which paging files are created.
   The selected drive under [Drive] of [Paging file size for selected drive] is displayed.
   Notes
   - No dump files and paging files can be stored at the iSCSI connection destination during internal disk boot and SAN (FC) boot.
   - The file system for ReFS volumes cannot store paging files.
7. Select [Custom size], and enter a value in [Initial size].
   The specified size must be greater than the size of mounted memory plus 1 MB in order to acquire memory dumps normally. The recommended size is approximately 1.5 times the size of mounted memory.
   Notes
   - Check [Automatically manage paging file size for all drives].
   - Select [System managed size].
8. Enter a value in [Maximum size].
   Specify a value that is the same as or larger than [Initial size]. The recommended size is the same as [Initial size].
9. Save settings.
   Click [Set] under [Paging file size for selected drive].
   The settings are saved, and [Paging File Size] of [Drive] displays the set values.
10. Click the [OK] button to close the [Virtual Memory] dialog box.
    The message [You must restart your computer to apply these changes] appears. Click the [OK] button to close the message box.
11. Click the [OK] button to close the [Performance Options] dialog box.

12. Click the [OK] button to close the [System Properties] dialog box.
13. Restart the partition.
    After the partition restart, the settings take effect.

<For Windows Server 2008 R2>
Configure the paging file in the following procedure.

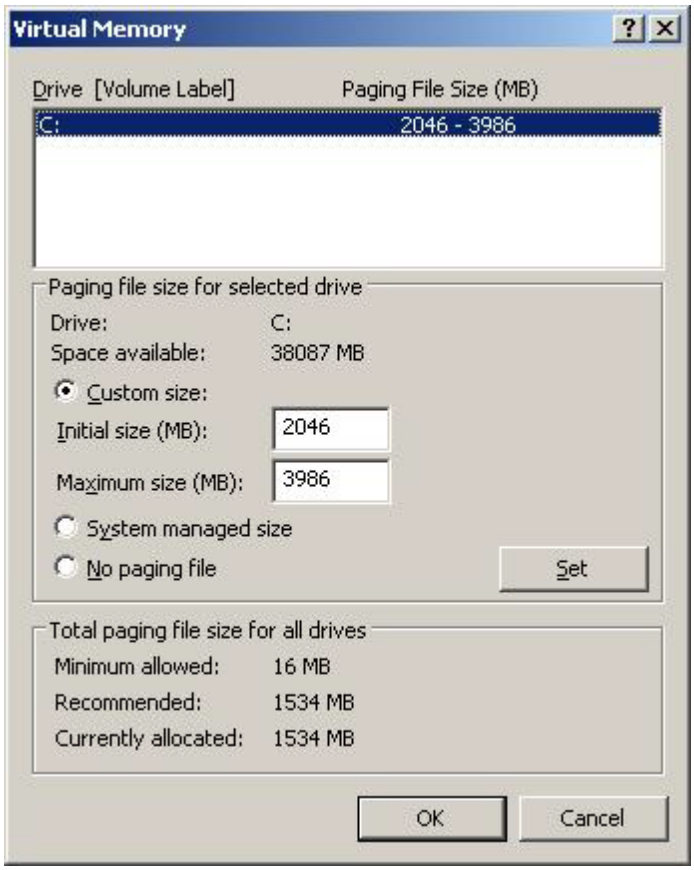
1. Log in to the server with Administrator privileges.
2. Select [Control Panel] - [System].
   The [System Properties] dialog box appears.
3. Click the [Advanced] tab. Then, click [Performance] - [Settings].
   The [Performance Options] dialog box appears.
4. Click the [Advanced] tab.

FIGURE 10.19 Advanced options dialog box



5. Click [Change] in [Virtual Memory].
   The [Virtual Memory] dialog box appears.

FIGURE 10.20 [Virtual Memory] dialog box



6. Specify the drive on which to create the paging file.
   Select the system installation drive in [Drive].
   [Drive] in [Paging file size for selected drive] displays the selected drive.
7. Select a value in [Custom size]. Enter a value in [Initial size].
   To correctly acquire a memory dump, the specified size must be equivalent to the size of mounted memory plus 1 MB or more. About 1.5 times the size of the mounted memory is recommended.
8. Enter a value in [Maximum size].
   Be sure to specify a value larger than or equal to [Initial size]. The same size as [Initial size] is recommended.
9. Save the settings.
   Click [Set] in [Paging file size for selected drive].
   This saves the settings. [Paging file size] in [Drive] displays the entered values.
10. Click the [OK] button to close the [Virtual Memory] dialog box.
11. Click the [OK] button to close the [Performance Options] dialog box.
12. Click the [OK] button to close the [System Properties] dialog box.
13. Restart the partition.
    After the partition restart, the settings take effect.

10.4.4 Acquiring data for investigation (RHEL)

If a problem occurs in RHEL, data on the situation is required for ensuring a prompt and correct investigation. For details on setting of dump environment, contact the distributor where you purchased your product, or your sales representative.

10.4.5 sadump

If a problem occurs in the partition which is operating on RHEL, memory dump is acquired as shown 10.4.4 Acquiring data for investigation (RHEL). However, acquiring memory dump sometimes fail. In such cases, memory dump is acquired by sadump in PRIMEQUEST 2400E and 2800E. PRIMEQUEST 2800B does not support sadump.

Below steps are how to acquire memory dump by sadump where partition does not operate due to hung-up of operating system and so on.

1. Select [Power Control] from [Partition] menu in MMB Web-UI.
   [Power Control] window appears
2. Select [sadump] and click [Apply] button in [Power Control] window.
   The partition status changes to [Dumping].
   Below window appears during memory dump

```
ACPI(PNP0A03,0)/PCI(7,0)/ACPI(PNP0F03,0):
#########################                                  x.x%]
```

- When acquiring memory dump completes, the partition becomes to either of below state.
- The partition automatically starts to re-start.
  The partition status changes to [Halt] and system also becomes to halt state.
  In this case, restart the partition manually.
  When acquiring memory dump completes, below window appears.

```
ACPI(PNP0A03,0)/PCI(7,0)/ACPI(PNP0F03,0):
                                                          [100.0%]
Dumping Complete. Waiting for reboot...
```

Make the acquired memory dump portable and submit it to distributor where you purchased your product, or your sales representative. For the way how to make memory dump portable, see the manual of operating system.
sadump may automatically start in some operating systems. For such cases, see the manual of operating system.
Note
If the first disk fails when dump device is duplicated, memory dump is output into secondary disk. However, memory dump terminates abnormally if the device error is detected during memory dump into first disk.

10.5 Configuring and Checking Log Information

This section describes how to configure and confirm the log information on problems that occurred in the system.

10.5.1 List of log information

This section lists the types of log information that can be acquired.

- Available log information
- System event log
- Syslog and event log
- Agent log
- Partition Event Log
- Hardware error log
- BIOS error log
- Information on factors in partition power supply control
- Network configuration log information
- NTP client log information
- REMCS configuration log information

- Operation log information
- Physical inventory (including PCI_Boxes) information
- System and partition configuration information
- System and partition configuration file
- Information on internal rack sensor definitions

10.6 Firmware Updates

The PRIMEQUEST 2000 series server is configured with BIOS, BMC, and MMB firmware.
Each firmware is managed as a total version integrating different versions.
The firmware is updated from the MMB in batch (applying to all the firmware at all locations within the system).

For details on firmware updates, see 1.6.1 [Firmware Update] menu in the *PRIMEQUEST 2000 Series Tool Reference* (C122-E177EN).

10.6.1 Notes on updating firmware

If the MMB or SB fails, perform maintenance on it before updating the firmware. Do not update the firmware in a configuration containing a faulty MMB or SB.

Appendix A Functions Provided by the PRIMEQUEST 2000 Series

This appendix lists the functions provided by the PRIMEQUEST 2000 series. It also lists management network specifications.

A.1 Function List

The following lists the functions provided by the PRIMEQUEST 2000 series.

A.1.1 Action

TABLE A.1 Action

Operation	Minor item	Description
User operation	User operation setting	Operation privilege setting for each user account
		Account synchronization between duplicate MMBs via LDAP
	GUI	Web user interface
	CLI	MMB command line interface
		SVS command line interface
External interface	KVM (local)	Local VGA, USB
Remote console	Console redirection	Serial console over LAN
	Video redirection	Function that uses PC connected to management LAN as graphical console
	Virtual media	Function that assumes drive of drive partition side of management LAN connection PC etc
UEFI	UEFI interface	UEFI shell
		Boot Manager

A.1.2 Operation

TABLE A.2 Operations

operation	Minor item	Description
System construction	Management LAN setting	MMB management LAN setting
		Maintenance LAN (REMCS/CE port) setting
		Network setting internal LAN
	Operating privilege/range setting	User account management
	Partition configuration	Partition creation/editing/removal
		CPU/DIMM configuration check
	Memory Operation Mode	- Performance Mode(per partition) - Normal Mode(per partition) - Partial Memory Mirror Mode(per partition) - Full Mirror Mode(per partition) - Spare Mode(per partition)
	PCI_Box control	PCI_Box management, allocation to partitions
	Virtualization	MAC address fixing of internal LAN PCH
System operation/ power control	Start	Power-on by Web-UI, CLI or Wake On LAN
	Stop	Shutdown or forced power-off from Web-UI, CLI or OS
	Restart	Reboot from Web-UI or OS, partition reset

operation	Minor item	Description
	Power recovery processing	Power-on control when power is restored from AC Lost
	Boot control	Boot device selection in Web-UI
		Diagnosis mode selection at boot
		Boot device selection by UEFI Boot Manager, boot option setting
	Scheduled operation	Automatic power-on/off at specified date and time specification
	Wake On LAN	Power-on via network
Automatic recovery	Degraded operation	Automatic degraded operation on CPU, DIMM, SB, etc
	Reserved SB	SB automatic switching from faulty SB to Reserved SB
	ASR	Automatic restart of partition when failure occurs
Continuous operation	Continuous operation	Processing takeover between duplicate MMBs
		Recovery by MMB or BMC reset, continuous partition operation
Ecological operation	Power consumption management	Cabinet power consumption monitoring, notification to higher-level software
	PSU power-on count control	PSU power-on control only as needed
	FAN speed control	Optimum control of FAN speed
Dynamic Reconfiguration (DR)	Add/Remove	The configuration change is possible compared with the partition OS's operating.
Time synchronization	NTP client	NTP client

A.1.3 Monitoring and reporting functions

TABLE A.3 Monitoring and reporting functions

operation	Minor item	Description
Hardware monitoring and reporting	Hardware problem monitoring	Hardware problem monitoring by MMB/BMC/UEFI
	Partition problem monitoring	Watchdog Timer monitoring by MMB/UEFI
	Power control problem monitoring	Power control sequence problem monitoring
	FAN speed problem monitoring	Fan speed problem monitoring
	Voltage problem monitoring	Voltage problem monitoring
	Temperature problem monitoring	Temperature problem monitoring
	Hardware proactive monitoring	Proactive monitoring of CPU, DIMM, and HDD hardware failures
	External reporting	External reporting by e-mail, SNMP, or REMCS
	Event monitoring	Sensor-detected event monitoring
	Threshold monitoring	Threshold monitoring of temperature, power voltage, and fan speed
Status display	LED display	Display of MMB and system status
		Location display (Location LED)
		Faulty component display
	Eco-related status display	Cabinet power consumption display
		FAN speed display
		PSU/DDC power-on status display
		Temperature display
		Eco status acquisition from higher-level software

operation	Minor item	Description
		(SNMP)
Log	Log type	Expand contents and enhance history information of MMB-collected log - System event log - Hardware and UEFI error log - Power control and factor information - Network setting and log - MMB operation log, login record - Firmware version - Mounting unit information - Partition configuration and setting - Sensor information - Various firmware log dumps
	Log download	Batch download of MMB-collected logs (SEL download)
Hardware error processing	Fault location	Faulty component indication
	WHEA support	Support of Windows Hardware Error Architecture

A.1.4 Maintenance

TABLE A.4 Maintenance functions

operation	Minor item	Description
Component replacement	Replacement target	Cold replacement, non-hot/hot-system/hot maintenance
		Hot maintenance support by the hot plug
	Replacement target component indication	Replacement target component indicated by SEL or LED
	Hot Plug	PCI Express card, HDD/SSD
		Replacement SB by DR
FRU management	FRU management	FRU information management for FRU management target components Serial No., part No., product name, etc.
		System information management and backup by FRU
Log management	Log collection	Log collection and generation management by MMB
	Log clear	MMB log clear
Firmware management	Generation management	Management at one generation
	Version display	Overall version display
	Firmware update	Batch firmware update in Web-UI/CLI
		Version matching between SBs by MMB (BIOS/BMC)
		SB version confirmation at power-off
Configuration setting information management	Configuration setting information save and restore	Save and restoration of MMB/UEFI/REMCS information
Maintenance guidance	Maintenance wizard	Component replacement procedure instructions on Web-UI
Failure cause search	Internal log trace	MMB/BMC internal log acquisition
	Dump function	MMB core dump
		sadump
	Hardware log	CPU/chip set hardware log
Remote maintenance	REMCS	REMCS - Hardware failure information notification - System configuration information notification

A.1.5 Redundancy functions

TABLE A.5 Redundancy functions

operation	Minor item	Description
Network	Management LAN duplication	Management LAN duplication switching
Power supply	Dual power feed	Dual power feed monitoring
	PSU redundancy	PSU N+1 redundancy monitoring and control
Unit	FAN redundancy	Fan redundancy monitoring and control
	MMB duplication (*1)	MMB duplication control
		Return of reset and doubling after switch anomaly detection
	SB redundancy (*1)	Faulty SB switching with Reserved SB
Component and module	DIMM duplication	Memory Mirror mode (each partition)
	DINN spare	Memory Spare Mode (each partition)
	Firmware storing memory duplication	FWH duplication
System clock	Clock multiplexing	PRIMEQUEST 2000 series server has oscillator on each SB. Distribution from Home SB
System	Cluster in cabinet	Independent clock in each partition

*1: Available for only PRIMEQUEST 2400E and 2800E.

A.1.6 External linkage functions

TABLE A.6 External linkage functions

operation	Minor item	Description
External IF/API	IPMI/RMCP	IPMI/RMCP interface
	SNMP	SNMP interface
	telnet/ssh	Access to MMB CLI via telnet/ssh
	http/https	Access to MMB Web-UI via http/https
	NTP	Time synchronization with NTP client of MMB
EMS linkage	ServerView Suite linkage	Linkage with ServerView Suite
	Other management software linkage	Linkage with server management software of each company
CLUSTER linkage	PRIMECLUSTER linkage	Linkage with PRIMECLUSTER
UPS linkage	Power failure control	Coordinated support with UPS device in power failure shutdown processing
		User script execution support before power failure shuts down
External file device linkage	Increase file device	Support of increase file device
Installer linkage	OS install support	Support of ServerView Installation Manager
GDS linkage	GDS linkage	Support of software RAID (RHEL)
PXM linkage	PXM linkage	Support of PXM (XSP emulation)

A.1.7 Security functions

TABLE A.7 Security functions

operation	Minor item	Description
Security setting	External IF security setting	Network security setting (SSL, SSH, etc.)
User management/ authentication	User authentication	MMB login account management
	User authentication linkage	Synchronization of the account between doubling MMB
Audit trail	Operating log	Records such as MMB operating log and login history, etc.
TPM	TPM	Support of TPM function

A.2 Correspondence between Functions and Interfaces

The following shows the correspondence between the functions provided by PRIMEQUEST 2000 series and interfaces.

A.2.1 System information display

TABLE A.8 System information display

Function	MMB Web-UI	MMB CLI	UEFI	PSA Web-UI	PSA CLI/ SVS CLI
System status display (Error, Warning)	Supported				
System event log (SEL) display	Supported				
System event log (SEL) download	Supported				
MMB Web-UI/CLI operating log display	Supported				
System information display (P/N, S/ N)	Supported				
Firmware version display	Supported	Supported			

A.2.2 System settings

TABLE A.9 System settings

Function	MMB Web-UI	MMB CLI	UEFI
Primary and secondary power feed	Supported	Supported	
Power-on setting at power recovery	Supported	Supported	
Start delay time at power recovery	Supported	Supported	
Installation altitude	Supported	Supported	
PSU redundancy setting	Supported	Supported	
It sets it to Reserved SB at the maximum waiting time until Force Power Off of Partition including correspondence SB at the switch is begun	Supported		
Effective and invalid setting of Power Saving function as the entire System	Supported		
Power consumption threshold (Limit value) setting of the entire System	Supported		

A.2.3 System operation

TABLE A.10 System operation

Function	MMB Web-UI	MMB CLI	UEFI
System power control (On/Off/Force P-off)	Supported	Supported	

A.2.4 Hardware status display

TABLE A.11 Hardware status display

Function	MMB Web-UI	MMB CLI	UEFI
LED status display	Supported		
LED operation (on, clear, blinking)	Supported		

Function	MMB Web-UI	MMB CLI	UEFI
PSU (power supply unit) power-on count and status display	Supported		
System power consumption display	Supported		
FAN status monitoring and FAN speed display	Supported		
Temperature monitoring and display	Supported		
Voltage monitoring and display	Supported		
SB status display (CPU, DIMM, Mezzanine, RAID slot, HDD/SDD, Chipset, TPM, BMC, FBU, clock)	Supported		
IOU status display	Supported		
DU status display	Supported		
OPL status display	Supported		
MMB status display	Supported		
PCI_Box status display	Supported		

A.2.5 Display of partition configuration information and partition status

TABLE A.12 Display of partition configuration information and partition status

Function	MMB Web-UI	MMB CLI	UEFI
Partition status display (number of CPUs, COREs, memory size, power status)	Supported	Supported	

A.2.6 Partition configuration and operation setting

TABLE A.13 Partition configuration and operation setting

Function	MMB Web-UI	MMB CLI	UEFI
Partition configuration	Supported	Supported	
Reserved SB allocation	Supported	Supported	
CPU setting			Supported
Flexible I/O mode		Supported	
ASR (Automatic Server Restart) setting for partitions	Supported		
I/O space allocation to I/O device			Supported
Memory Operation Mode	Supported	Supported	
Memory Mirror RAS Mode	Supported	Supported	
PCI Address Mode	Supported	Supported	
Dynamic Reconfiguration (DR)	Supported	Supported	
TPM			Supported

A.2.7 Partition operation

TABLE A.14 Partition operation

Function	MMB Web-UI	MMB CLI	UEFI
Video redirection/ Virtual media	Supported		
Console redirection		Supported	
UEFI shell			Supported

A.2.8 Partition power control

TABLE A.15 Partition power control

Function	MMB Web-UI	MMB CLI	UEFI
Power-on	Supported	Supported	
Power-off (shutdown)	Supported	Supported	
Reset	Supported	Supported	
NMI	Supported	Supported	
Forced power-off	Supported	Supported	
sadump	Supported	Supported	
Diagnosis mode selection at power on	Supported		
Scheduled operation	Supported		

A.2.9 OS boot settings

TABLE A.16 OS boot settings

Function	MMB Web-UI	MMB CLI	UEFI
OS boot device selection			Supported
OS boot priority setting			Supported
OS boot option setting			Supported
OS boot delay time setting			Supported
PXE/iSCSI boot network device setting			Supported
Boot control (boot setting override)	Supported		

A.2.10 MMB user account control

TABLE A.17 MMB user account control

Function	MMB Web-UI	MMB CLI	UEFI
MMB user account setting and Display	Supported	Supported	
MMB login user display	Supported	Supported	

A.2.11 Server management network settings

TABLE A.18 Server management network settings

Function	MMB Web-UI	MMB CLI	UEFI
Setting of MMB date, time, and time zone	Supported	Supported	
MMB time synchronization (NTP) setting	Supported		
MMB management LAN setting	Supported	Supported	
Internal LAN setting	Supported		
Maintenance LAN setting	Supported	Supported	
MMB LAN port setting	Supported		
MMB network protocol setting	Supported	Supported	
SNMP setting	Supported	Supported	
SNMP setting (V3)	Supported		
SSL setting	Supported		
SSH setting	Supported	Supported	
Remote Server Management user setting (RMCP)	Supported		
Access control setting	Supported		
Alarm E-Mail setting	Supported		
MMB network status display command		Supported	

A.2.12 Maintenance

TABLE A.19 Maintenance

Function	MMB Web-UI	MMB CLI	UEFI
Batch firmware update	Supported	Supported	
MMB configuration information save and restore	Supported		
BIOS configuration information save and restore	Supported		
Maintenance wizard: Component Replacement	Supported		
Maintenance wizard: Maintenance mode setting and cancellation	Supported		
SB hot addition		Supported	
IOU hot addition		Supported	

A.3 Management Network Specifications

The following lists the management network specifications of the PRIMEQUEST 2000 series.

TABLE A.20 Management network specifications

Component (A)	Communication direction	Component (B)	USER port	CE port	REMCS port	Partition LAN port	Protocol (Port No.)	Port No.
Terminal software	Duplex	(MMB)	Used	Used	Not used	Not used	telnet (TCP23)	Changeable
	Duplex						ssh (TCP 22)	Changeable
Video Redirection/ Virtual media	Duplex	MMB/ BMC	Used	Used	Not used	Not used	VNC (TCP80)	
FST	Duplex	MMB	Used	Used	Not used	Not used	telnet (TCP23)	Changeable
	Duplex						ssh (TCP 22)	Changeable
	Duplex						RMCP (UDP623)	
REMCS Center	From B to A	MMB	Used	Used	Used	Not used	SMTP	Changeable
NTP server (clock device)	Duplex	MMB (client)	Used	Used	Not used	Not used	NTP (UDP123)	
Web browser	Duplex	MMB/PSA	Used	Used	Not used	Not used	http/https (TCP 8081)	Changeable
SVOM	Duplex	(MMB)	Used	Used	Not used	Not used	telnet (TCP23)	Changeable
	Duplex						ssh (TCP 22)	Changeable
	Duplex						snmp (UDP161)	Changeable
	From B to A						snmp trap (UDP 162)	Changeable

Component (A)	Communication direction	Component (B)	USER port	CE port	REMCS port	Partition LAN port	Protocol (Port No.)	Port No.
	Duplex						RMCP (UDP623)	

TABLE A.21 Management network specifications

Component (A)	Communication direction	Component (B)	USER port	CE port	REMCS port	Partition LAN port	Protocol (Port No.)	Port No.
SVOM	Duplex	ServerView Agent	Not used	Not used	Not used	Used	snmp (UDP161)	
	From B to A						snmp trap	
	Duplex						SERVERVIEW-RM (TCP/UDP 3172)	
	Duplex	PING	Used	Used	Not used	Used	ICMP	
	Duplex	SMTP Server	Not used	Not used	Not used	Used	SMTP (TCP/UDP 25)	
	Duplex	PostgreSQLDB	Not used	Not used	Not used	Used	PostgreSQL(TCP/UDP9212)	
	Duplex	MS SQL DB	Not used	Not used	Not used	Used	MS-SQL-S(TCP/UDP1433)	
							MS-SQL-M(TCP/UDP1434)	

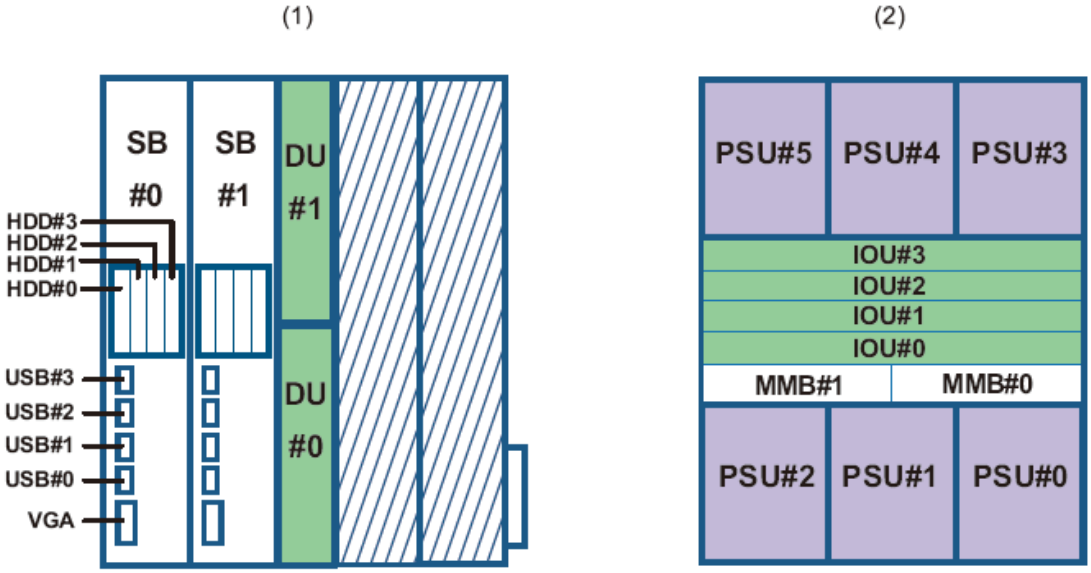
Appendix B Physical Mounting Locations and Port Numbers

This appendix describes the physical mounting locations of components, and shows MMB and IOU port numbers.

B.1 Physical Mounting Locations of Components

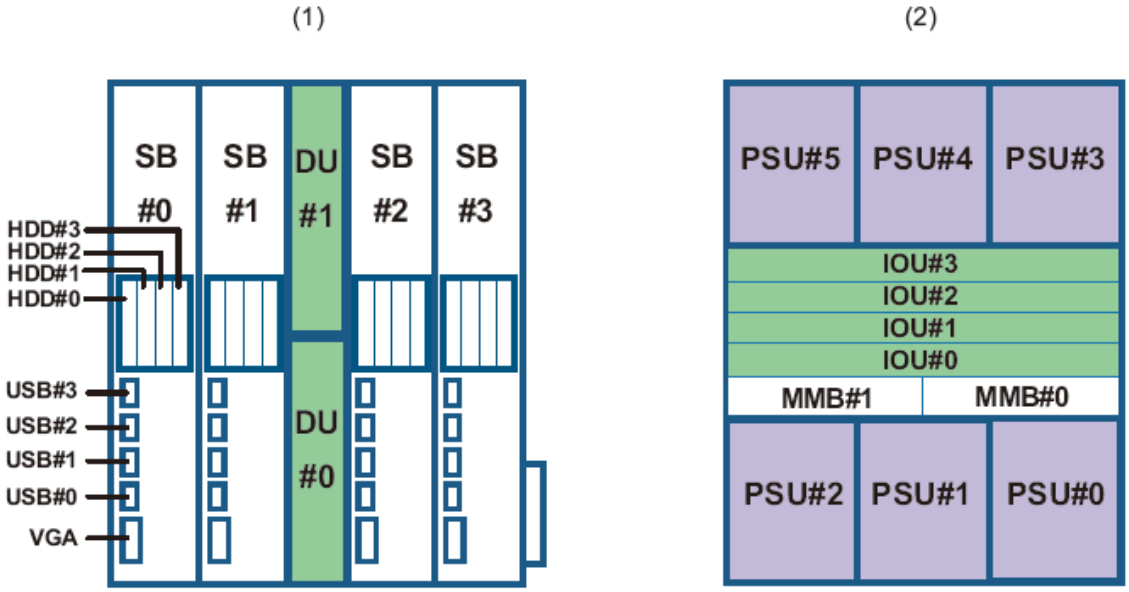
This section describes the physical mounting locations of components.

FIGURE B.1 Physical mounting locations in the PRIMEQUEST 2400E



No.	Explanation
(1)	Front
(2)	Rear

FIGURE B.2 Physical mounting locations in the PRIMEQUEST 2800E/2800B



No.	Explanation
(1)	Front
(2)	Rear

FIGURE B.3 Physical mounting locations in the DU

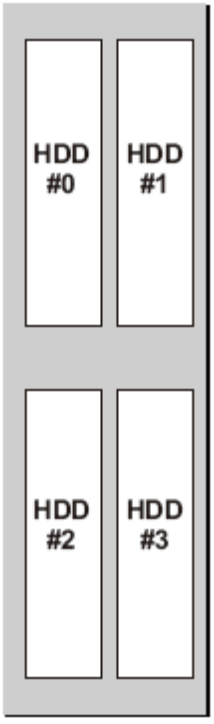
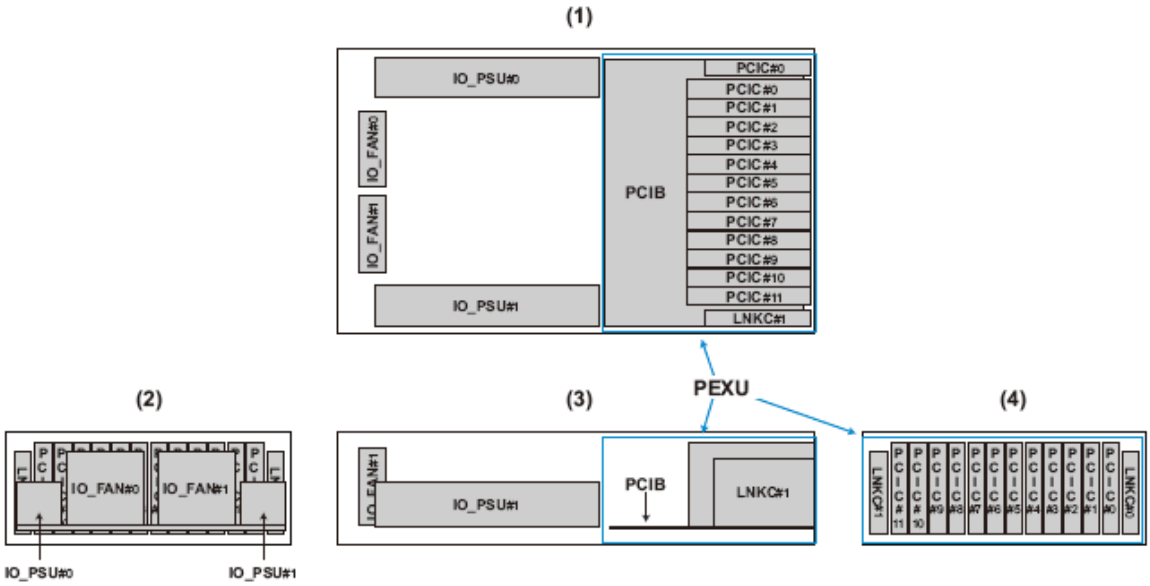


FIGURE B.4 Physical mounting locations in the PCI_Box



No.	Explanation
(1)	Upper side
(2)	Front
(3)	Right side
(4)	Rear

B.2 Port Numbers

This section shows the numbering policy of each MMB and IOU port.

Remarks

The character strings used in numbering are the port numbers as viewed from firmware. These port numbers differ from the character strings in the port identification printed, stamped, or otherwise marked on units. FIGURE B.5 MMB port numbers shows MMB port numbering. “FIGURE B.7 IOU_1GbE port numbers” and “FIGURE B.8 IOU_10GbE port numbers” shows MMB port numbering.

FIGURE B.5 MMB port numbers

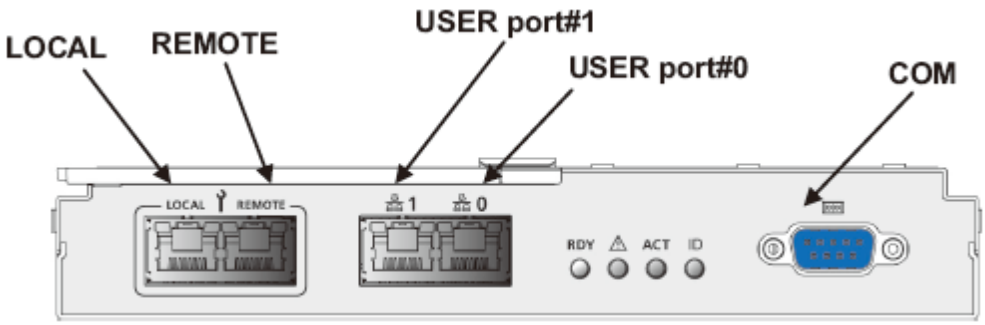


FIGURE B.6 IOU_1GbE port numbers

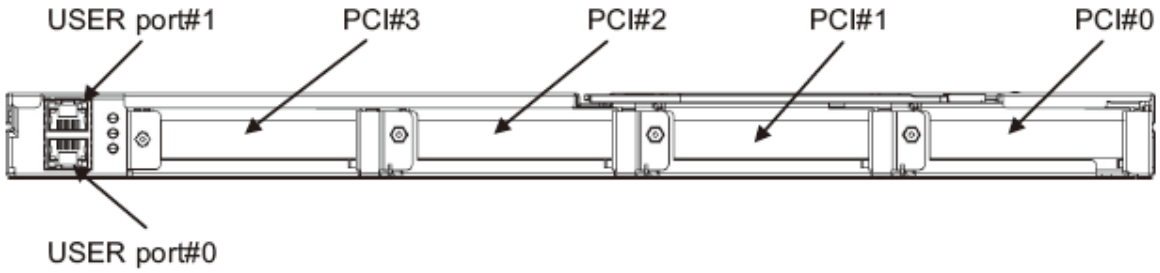
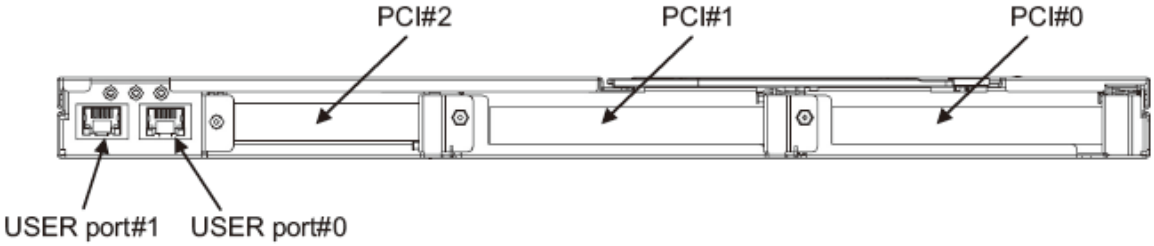


FIGURE B.7 IOU_10GbE port numbers



Appendix C Lists of External Interfaces Physical

This appendix describes the external interfaces of the PRIMEQUEST2000 series.

C.1 List of External System Interfaces

The following lists the external system interfaces.

TABLE C.1 External system interfaces

IO interface	Mounting component	Number of ports	Location	Remarks
USB	SB	4	Front	USB 2.0
VGA	SB	1	Front	Max.1600 x 1200 dots, 65536 colors
PCI Express Slot (SB)	SB	1	(*1)	RAID card
HDD/SSD (*3)	SB	4	Front	2.5inch HDD/SSD
LAN (IOU)	IOU_1GbE	2	Rear	GbE
	IOU_10GbE	2	Rear	10GbE
HDD/SSD	DU	4	Front	2.5inch HDD/SSD
PCI_Box (*3) interface (PCNC mounting IOU)	IOU_1GbE	2(*2)	Rear	PCI Express Gen3 8Lane
	IOU_10GbE	1(*2)	Rear	PCI Express Gen3 8Lane
PCI Box (*3) Interface (PCI_Box)	PCI Box	2	Rear	PCI Express Gen3 8Lane
PCI Express Slot (IOU)	IOU_1GbE	4	Rear	
	IOU_10GbE	3	Rear	
PCI Express Slot (PCI_Box) (*3)	PCI Box	12	Rear	

*1: It has the PCI Express slot in SB. A physical interface does not go out outside of the case.
*2: It provides with the interface to the PCI box by installing PCNC in the PCI Express slot.
*3: Available for only PRIMEQUEST 2400E and 2800E.

C.2 List of External MMB Interfaces

The following lists the external MMB interfaces.

TABLE C.2 External MMB interfaces

External interface		Number of ports	Location	Remarks
LAN (MMB)	1000Base-T	2	Rear	User Port(Management LAN)
	100Base-TX	1	Rear	Maintenance LAN Port
	100Base-TX	1	Rear	REMCS Port
COM		1	Rear	Connector Type: Dsub 9pin

Appendix D Physical Locations and BUS Numbers of Built-in I/O, and PCI Slot Mounting Locations and Slot Numbers

This appendix shows the correspondence between the physical locations and BUS numbers of built-in I/O in the PRIMEQUEST 2000 series server. It also shows the correspondence between PCI slot mounting locations and slot numbers.

D.1 Physical Locations and BUS Numbers of Internal I/O Controllers of the PRIMEQUEST 2000 Series

The following table shows physical location and BUS numbers of SB internal I/O controllers.
.

TABLE D.1 physical locations of SB internal I/O controllers and BUS numbers

Internal I/O	BUS:DEV:FUNC	Remarks
Home SB-USB EHCI controller	00:1A:0	USB Port #0
		USB Port #1
	00:1D:0	USB Port #2
		USB Port #3
		Video redirection
		Virtual media

D.2 Correspondence between PCI Slot Mounting Locations and Slot Numbers

The following table shows the correspondence between PCI slot mounting locations and slot numbers.

TABLE D.2 Correspondence between PCI Slot Mounting Locations and Slot Numbers

Mounting location		Slot number (decimal number)		
Board	Slot	PRIMEQUEST 2400E	PRIMEQUEST 2800E	PRIMEQUEST 2800B
SB#0	Port to IOU#0 (*1)	4097	4097	4097
	Port to IOU#1 (*1)	4098	4098	4098
	Port to IOU#2 (*1)	4099	4099	4099
	Port to IOU#3 (*1)	4100	4100	4100
SB#1	Port to IOU#0 (*1)	4113	4113	4113
	Port to IOU#1 (*1)	4114	4114	4114
	Port to IOU#2 (*1)	4115	4115	4115
	Port to IOU#3 (*1)	4116	4116	4116
SB#2	Port to IOU#0 (*1)	N/A	4129	4129
	Port to IOU#1 (*1)	N/A	4130	4130
	Port to IOU#2 (*1)	N/A	4131	4131

Mounting location		Slot number (decimal number)		
Board	Slot	PRIMEQUEST 2400E	PRIMEQUEST 2800E	PRIMEQUEST 2800B
	Port to IOU#3 (*1)	N/A	4132	4132
SB#3	Port to IOU#0 (*1)	N/A	4145	4145
	Port to IOU#1 (*1)	N/A	4146	4146
	Port to IOU#2 (*1)	N/A	4147	4147
	Port to IOU#3 (*1)	N/A	4148	4148
IOU#0	PCIC#0	2	2	2
	PCIC#1	3	3	3
	PCIC#2	4	4	4
	PCIC#3 (*2)	5	5	5
IOU#1	PCIC#0	18	18	18
	PCIC#1	19	19	19
	PCIC#2	20	20	20
	PCIC#3 (*2)	21	21	21
IOU#2	PCIC#0	34	34	34
	PCIC#1	35	35	35
	PCIC#2	36	36	36
	PCIC#3 (*2)	37	37	37
IOU#3	PCIC#0	50	50	50
	PCIC#1	51	51	51
	PCIC#2	52	52	52
	PCIC#3 (*2)	53	53	53
PCI_BOX#0 (*3)	PCIC#0	65	65	N/A
	PCIC#1	66	66	N/A
	PCIC#2	67	67	N/A
	PCIC#3	68	68	N/A
	PCIC#4	69	69	N/A
	PCIC#5	70	70	N/A
	PCIC#6	71	71	N/A
	PCIC#7	72	72	N/A
	PCIC#8	73	73	N/A
	PCIC#9	74	74	N/A
	PCIC#10	75	75	N/A
	PCIC#11	76	76	N/A
PCI_Box#1 (*3)	PCIC#0	81	81	N/A
	PCIC#1	82	82	N/A
	PCIC#2	83	83	N/A
	PCIC#3	84	84	N/A
	PCIC#4	85	85	N/A
	PCIC#5	86	86	N/A
	PCIC#6	87	87	N/A
	PCIC#7	88	88	N/A
	PCIC#8	89	89	N/A
	PCIC#9	90	90	N/A
	PCIC#10	91	91	N/A
	PCIC#11	92	92	N/A
PCI_BOX#2 (*3)	PCIC#0	97	97	N/A
	PCIC#1	98	98	N/A
	PCIC#2	99	99	N/A
	PCIC#3	100	100	N/A
	PCIC#4	101	101	N/A
	PCIC#5	102	102	N/A
	PCIC#6	103	103	N/A
	PCIC#7	104	104	N/A
	PCIC#8	105	105	N/A

Mounting location		Slot number (decimal number)		
Board	Slot	PRIMEQUEST 2400E	PRIMEQUEST 2800E	PRIMEQUEST 2800B
	PCIC#9	106	106	N/A
	PCIC#10	107	107	N/A
	PCIC#11	108	108	N/A
PCI_Box#3 (*3)	PCIC#0	113	113	N/A
	PCIC#1	114	114	N/A
	PCIC#2	115	115	N/A
	PCIC#3	116	116	N/A
	PCIC#4	117	117	N/A
	PCIC#5	118	118	N/A
	PCIC#6	119	119	N/A
	PCIC#7	120	120	N/A
	PCIC#8	121	121	N/A
	PCIC#9	122	122	N/A
	PCIC#10	123	123	N/A
	PCIC#11	124	124	N/A

N/A: Not applicable
*1: If DR is ‘Disabled’, the slot number is not allocated.
*2: IOU_10GbE does not have PCI Slot #3.
*3: PCI_Box can be available for only PRIMEQUES 2400E and 2800E.

Appendix E PRIMEQUEST 2000 Series Cabinets (Link)

For details on PRIMEQUEST 2000 series cabinets and components and PCI_Box cabinets and components, see Chapter 1 Installation Information in the PRIMEQUEST 2000 Series Hardware Installation Manual (C122-H004EN).

Appendix F Status Checks with LEDs

This appendix describes the types of mounted LEDs for the PRIMEQUEST 2000 series. It also describes how to check the status with LEDs.

F.1. LED Type

The PRIMEQUEST 2000 series has
Customer Self Service (CSS) LED, System Alarm LED, and Location LED on front side of the cabinet. CSS LED and System Alarm LED indicate faulty status of entire system. Location LED indicates physical location of the system.
The PRIMEQUEST 2000 series also has Power LED, Alarm LED, and Location LED in components. Power LED indicates power status in the component. Alarm LED indicates whether there is an error in the component. Location LED indicates the mounting location of the component. Location LED can be set to on and off. When you replace the component by using Maintenance Wizard, Location LED helps your work.

F1.1 Power LED, Alarm LED, and Location LED

In principle, each component for the PRIMEQUEST 2000 series comes equipped with the following LEDs.

TABLE F.1 Power LED, Alarm LED, and Location LED

LED type	Color	Function
Power	Green	Indicates the power status of the component.
Alarm	Orange	Indicates whether there is an error in the component.
Location	Blue	- Identifies the component (location). - Can be arbitrarily set to blink or turned off by the user. - Indicates the component undergoing maintenance when Maintenance Wizard is running.

F.1.2 PSU

The PSU comes equipped with the following LED.

TABLE F.2 PSU LED

LED type	Color	Function
FANM#0 Alarm	Orange	Indicates state of FANM#0.
Power/Alarm	Yellow/Green	Indicates whether there is AC input to each PSU, whether there is an error in the PSU, and the PSU on/off status.
FANM#1 Alarm	Orange	Indicates state of FANM#1

TABLE F.3 Power status and PSU LED display

Status	FANM#0 Alarm	Power/Alarm	FANM#1 Alarm	OPL CSS (*2)
PSU AC input is off.	Off	Off	Off	Off
AC input is on, and the PSU is off.	Off	Blinking in green	Off	Off
AC input is on, and the PSU is on.	Off	On (green)	Off	Off
PSU temperature error is predicted.	Off	On (green)	Off	On (yellow)
PSU temperature error is detected or the power system error in a PSU is predicted.	Off	Blinking in green	Off	On (yellow)
The power system of a PSU failed.	Off	On (yellow)	Off	On (yellow)
FANM#0 error occurs	Off or On (Orange) (*1)	Off	Off	On (yellow)
FANM#1 error occurs	Off	Off	Off or On (Orange) (*1)	On (yellow)

(*1) If Alarm LED is turning on orange, the FANM with the particular LED fails. Even though Alarm LED remains off, SEL may be displayed which indicates the FANM error due to detecting not enough fan rotation by preventive fan monitoring function.

(*2) There is a CSS LED on an OPL, not a PSU.

F.1.3 FANU

The FANU comes equipped with the following LED.

TABLE F.4 FAN LED

LED type	Color	Function
FANM#0 Alarm	Orange	Indicates state of FANM#0.
Power/Alarm	Green	Indicates power state of PSU supplying power to FANU.
FANM#1 Alarm	Orange	Indicates state of FANM#1

TABLE F.5 Power status and FANU LED display

Status	FANM#0 Alarm	Power/Alarm	FANM#1 Alarm	OPL CSS (*2)
PSU AC input is off.	Off	Off	Off	Off
AC input is on, and the PSU is off.	Off	Blinking in green	Off	Off
AC input is on, and the PSU is on.	Off	On (green)	Off	Off
FANU temperature error is predicted.	Off	On (green)	Off	On (yellow)
FANU temperature error is detected or the power system error in a PSU is predicted.	Off	Blinking in green	Off	On (yellow)
The power system of a FANU failed.	Off	On (yellow)	Off	On (yellow)
FANM#0 error occurs	Off or On (Orange) (*1)	Off	Off	On (yellow)
FANM#1 error occurs	Off	Off	Off or On (Orange) (*1)	On (yellow)

(*1) If Alarm LED is turning on orange, the FANM with the particular LED fails. Even though Alarm LED remains off, SEL may be displayed which indicates the FANM error due to detecting not enough fan rotation by preventive fan monitoring function.

(*2) There is a CSS LED on an OPL, not a PSU.

F.1.4 SB

SB comes equipped with the following LED.

TABLE F.6 SB LED

LED type	Color	Function
Power	Green	Indicates power state in a SB.
Alarm	Orange	Indicates whether there is error or not in a SB.
Location	Blue	Specifies a SB. - Can be arbitrarily set to blink or turned off by the user. - Indicates the component undergoing maintenance when Maintenance Wizard is running.

TABLE F.7 SB status and SB LED display

Status	Power	Alarm	Location
AC off and partition power Off	Off	Off	Off
Partition including SB Power On	On (green)		
Error of SB		On (orange)	
Identifying SB (Turn on by Maintenance Wizard)			On (blue)

F.1.5 IOU

IOU which is IOU_1GbE or IOU_10GbE comes equipped with the following LED.

TABLE F.8 IOU LED

LED type	Color	Function
Power	Green	Indicates power state in an IOU.
Alarm	Orange	Indicates whether there is error or not in an IOU.
Location	Blue	Specifies an IOU. - Can be arbitrarily set to blink or turned off by the user. - Indicates the component undergoing maintenance when Maintenance Wizard is running.

TABLE F.9 IOU status and IOU LED display

Status	Power	Alarm	Location
AC off and partition power Off	Off	Off	Off
Partition including IOU Power On	On (green)		
Error of IOU		On (orange)	
Identifying IOU (Turn on by Maintenance Wizard)			On (blue)

F.1.6 PCI Express slot of IOU

There is no LED in PCI Express slots of IOU.
To mount and unmounts PCI Express card in an IOU physically, take off the IOU from a cabinet.

F.1.7 DU

DU comes equipped with the following LED. Only Power LED is used. Attention LED is not used.

TABLE F.10 IOU LED

LED type	Color	Function
Power Left	Green	Indicates power state in a DU.
Alarm Right	Green	Indicates power state in a DU.
Attention Left	Orange	Not used.
Attention Right	Orange	Not used.

TABLE F.11 IOU status and IOU LED display

Status	Power Left	Power Right	Attention Left	Attention Right
Partition including PCI Express slot #0 off	On (green)		Off	Off
Partition including PCI Express slot #1 off		On (green)	Off	Off

F.1.8 HDD/SSD

The HDD or SSD comes equipped with the following LEDs.
HDD or SSD in a SB and HDD or SSD in a DU have same LEDs.

TABLE F.12 HDD/SSD LED

LED type	Color	Function	Note
HDD/SSD Access	Green	Indicates the HDD or SSD access status.	Mounted in only HDD or SSD.
HDD/SSD Alarm	Orange	Indicates whether there is an error in the HDD or SSD and the hot operation status.	Mounted in only HDD or SSD.

TABLE F.13 HDD/SSD status and LED display

HDD/SSD status	HDD/SSD Access	HDD/SSD Alarm	Note
Accessing to HDD or SSD	Blinking	Off	
Error of HDD or SSD	Off	On	When RAID configuration breaks. When Agent is offline.
Indicating location of HDD or SSD	Off	Blinking periodically with 3 Hz	When using SAS RAID card.

HDD/SSD status	HDD/SSD Access	HDD/SSD Alarm	Note
Rebuilding array	Blinking	Blinking periodically with 1 Hz	When using SAS RAID card.

F.1.9 MMB

The MMB comes equipped with the Active LED, Ready LED and Location LED. The Active LED indicates the active MMB, and the Ready LED indicates the MMB firmware status. Location LED is used to specify the MMB.
After the MMB firmware starts, the active MMB turns on the Active LED. The Ready LED blinks while MMB firmware startup is in progress. The Ready LED stays on when the startup is completed.

TABLE F.14 MMB LED

LED type	Color	Function
Ready	Green	Indicates the MMB status.
Alarm	Orange	Indicates whether there is an error in the MMB.
Active	Green	Indicates whether the MMB is the active or standby MMB.
Location (ID)	Blue	Identifies the MMB.

TABLE F.15 MMB (device) status and LED display

MMB status/device status	Ready	Alarm	Active	Location
MMB startup is in progress.	Blinking			
The MMB has started normally (Ready status).	On			
An error occurred in the MMB.		On		
The MMB is the standby MMB.			Off	
The MMB is the active MMB.			On	
The MMB is being located.				On

F.1.10 LAN

The LAN port comes equipped with the following LEDs. LAN ports in an IOU and LAN ports in a MMB have same LEDs.

TABLE F.16 LAN LEDs

LED type	Color	Function	Note
100M LAN Link/Act	Green	Indicates the Link status and Activity status of a 100M LAN.	Mounted only on the MMB
100M LAN Speed	Green	Indicates the communication speed of a 100M LAN.	Mounted only on the MMB
GbE LAN Link/Act (*1)	Green	Indicates the Link status and Activity status of a GbE LAN.	Mounted only on the MMB and IOU
GbE LAN Speed (*1)	Green/Orange	Indicates the communication speed of a GbE LAN.	Mounted only on the MMB and IOU
10GbE LAN Link/Act (*1)	Green	Indicates the Link status and Activity status of a 10GbE LAN.	Mounted only on the MMB and IOU
10GbE LAN Speed (*1)	Green/Orange	Indicates the communication speed of a 10GbE LAN.	Mounted only on the MMB and IOU

(*1) It is not enough to confirm the ‘Link’ state by only checking that Link LED is turning on. You can confirm that the LAN port is Link ‘state’ by not only checking that Link LED is turning on but also checking that the particular LAN port is ‘Enabled’ by MMB Web-UI.

TABLE F.17 LAN LED and Linkup Speed

NIC	Speed			
	10M	100M	1G	10G
GbE	Off	Green	Yellow	-
10GbE	-	Off	Yellow	Green

F.1.11 OPL

The OPL comes equipped with an LED indicating the status of entire system, the MMB Ready LED, and the System Alarm LED. From the OPL LED display, you can check the power status of the entire device, check for any problem, and check the MMB firmware status.

TABLE F.18 OPL LED

LED type	Color	Function
System Power	Green	Indicates the power status of the system.
CSS	Yellow	
System Alarm	Orange	Indicates whether there is an error in the system.
System Location	Blue	Identifies the system. - Can be arbitrarily turned on, set to blink, or turned off by the user.

TABLE F.19 System status and LED display

System status	System Power	CSS	System Alarm	Location
The system power status is standby. Standby status means that MMB is running and all partitions are off.	On (orange)			
Any of partition is on.	On (green)			
Warning or Error of CSS components in the system.		On		
Warning or Error of components other than CSS components in the system.			On	
Identifying the system.				On

F.1.12 PCI_Box

PCI_Box comes equipped with following LEDs.

TABLE F.20 PCI_Box LED

LED type	Color	Function
Power	Green	Indicates power state in a PCI_Box.
Alarm	Orange	Indicates whether there is error or not in a PCI_Box.
Location	Blue	Identifies a PCI_Box. - Can be arbitrarily set to blink or turned off by the user. - Indicates the component undergoing maintenance when Maintenance Wizard is running.

TABLE F.21 PCI_Box status and PCI_Box LED display

Status	Power	Alarm	Location
AC off and partition power Off	Off	Off	Off
Partition including PCI_Box Power On	On (green)		
Error of PCI_Box		On (orange)	
Identifying PCI_Box (Turn on by Maintenance Wizard)			On (blue)

F.1.13 PCI Express slot in PCI_Box

For PCI Express slot in a PCI_Box, Alarm LED turns on per a slot. LED display of PCI Express slot conforms to the standard of PCI Express.

TABLE F.22 PCI Express card status and LED display

PCI Express card status	Power	Alarm
Normal state of PCI Express card	On	Off
Error of PCI Express card		On
Inserting PCI Express card	Blinking	

F.1.14 IO_PSU

The IO_PSU comes equipped with the following LEDs.

TABLE F.23 IO_PSU LED

LED type	Color	Function	Note
AC	Green	Indicates whether there is AC input to the individual PSU.	IO_PSU control
DC	Green	Indicates the on/off status of each IO_PSU.	IO_PSU control
CHECK	Orange	Indicates whether there is an error in the IO_PSU.	MMB-FW control

TABLE F.24 IO_PSU status and LED display

Status	AC	DC	CHECK
AC input to all IO_PSUs is off.	Off	Off	Off
AC input to the IO_PSU is off, and AC input to another IO_PSU is on.	Off	Off	Off
AC input is on, and the IO_PSU is off (+5 V standby being output).	On	Off	Off
AC input is on, and the IO_PSU is on (+5 V standby being output, +12 V being output).	On	On	Off
There is an IO_PSU output error (+5 V standby being output, +12 V output error).	On	Off	On
There is an IO_PSU output error (+5 V standby output error, +12 V being output).	Off	On	On
There is an IO_PSU output error (+5 V standby output error, +12V output error).	Off	Off	On

F.1.15 IO_FAN

The IO_FAN comes equipped with the following LEDs.

TABLE F.25 IO_FAN LED

LED type	Color	Function
Alarm	Orange	Indicates whether there is an error in the IO_FAN.

TABLE F.26 IO_FAN status and LED display

Status	Alarm
Error in IO_FAN	On

F.2 LED Mounting Locations

This section describes the physical LED mounting locations on each component.

- Components equipped with Power, Alarm, and Location LEDs have the LEDs mounted as follows.
  - The order of mounted LEDs arranged from left to right is as follows: Power, Alarm, Location.
  - The order of mounted LEDs arranged from top to bottom is as follows: Power, Alarm, Location.
- From the standpoint of appearance, components equipped with LAN ports have the Speed LED on the left and the Link/Act LED on the right of each port.

FIGURE F.1 LED mounting locations on components equipped with LAN ports

LEDs

- The order of PSU and FANU LEDs arranged from the left or the top is as follows: FANM#0 Alarm, Power, and FANM#1 Alarm.

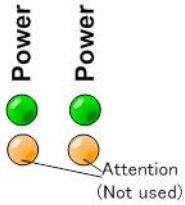
FIGURE F.2 Mounting locations of PSU and FANU

- The order of MMB LEDs arranged from the left or the top is as follows: Ready, Alarm, Active, and Location.

FIGURE F.3 MMB LED mounting locations

- The order of DU LEDs arranged as follows.

FIGURE F.4 DU LED mounting locations



- The order of System LEDs arranged from the left or the top is as follows: Power, Alarm, CSS, Location, MMB_Ready.

FIGURE F.5 System LED mounting locations

- The order of PCI_Box LEDs arranged from the left is as follows: IO_PSU, IO_FAN#0, IO_FAN#1, Power, Alarm, Location.

FIGURE F.6 PCI_Box LED mounting locations

F.3 LED list

The following table lists the mounted LEDs for the PRIMEQUEST 2000 series.

TABLE F.27 LED list (1/3)

Component		LED type	Color	Quantity	Status		Description
PSU		Power/ Alarm	Green/ orange	1	Off		PSU AC input off
					Blinking in green		PSU AC input on and PSU off See also F.1.2 PSU.
					On (green)		PSU AC input on and PSU on See also F.1.2 PSU.
					On (yellow)		Error at PSU
		FANM#0 Alarm	Orange	1	Off		Normal status in FANM#0 See also F.1.2 PSU.
					On		Error at FANM#0
		FANM#1 Alarm	Orange	1	Off		Normal status in FANM#1
					On		Error at FANM#1 See also F.1.2 PSU.
FANU		Power/ Alarm	Green	1	Off		PSU AC input off or no DC output to FANM
					Blinking		PSU AC input on and PSU off See also F.1.3 FANU.
					On		PSU AC input on and any of PSU in system on See also F.1.3 FANU.
		FANM#0 Alarm	Orange	1	Off		Normal status in FANM#0 See also F.1.3 FANU.
					On		Error at FANM#0
		FANM#1 Alarm	Orange	1	Off		Normal status in FANM#1
					On		Error at FANM#1 See also F.1.3 FANU.
SB		Power	Green		Off		SB power off
					On		SB power on
		Alarm	Orange		Off		SB normal
					On		Error in SB
		Location	Blue		Off		
					On		Identify SB
	HDD/SSD	Access	Green		Off		Non-active
					On		Active
		Alarm	Orange		Off		HDD/SSD normal
					On		Error in HDD/SSD
					Blinking	low speed (1Hz)	Rebuilding array in RAID
						High speed (3Hz)	Indicate location

TABLE F.28 LED list (2/3)

Component		LED type	Color	Quantity	Status		Description
IOU		Power	Green		Off		IOU power off
					On		IOU power on
		Alarm	Orange		Off		IOU normal
					On		Error in IOU
		Location	Blue		Off		
					On or Blinking		Component location
	LAN (IOU_1GbE)	Link/Act	Green		Off		Network not link
					Blinking in green		Network active
					On (green)		Network link
		Speed	Green/ Orange		Off		10Mbps
					On (green)		100Mbps
					On (orange)		1000Mbps
	LAN (IOU_10GbE)	Link/Act	Green		Off		Network not link
					Blinking in green		Network active
					On (green)		Network link
		Speed	Green/ Orange		Off		100Mbps
					On (green)		1000Mbps
					On (orange)		10Gbps
DU		Power	Green		Off		DU power off
					On		DU power on
		Attention	Orange		Off		
	HDD/SSD	Access	Green		Off		Non-active
					On		Active
		Alarm	Orange		Off		HDD/SSD normal
					On		Error in HDD/SSD
					Blinking	low speed (1Hz)	Rebuilding array in RAID
						High speed (3Hz)	Indicate location
MMB		Location	Blue		Off		
					On		Specify the MMB
		Ready	Green		Off		MMB not initialized
					Blinking		MMB initialization in progress
					On		MMB initialization complete (normal MMB operating status)
		Active	Green		Off		
					Blinking in green		Active MMB location
		Alarm	Orange		Off		
					On		Error in MMB
	LAN 1000BASE-T (MMB)	Link/Act (*1)	Green		Off		Network not link
					Blinking in green		Network active
					On (green)		Network link
		Speed	Green/ Orange		Off		10Mbps
					On (green)		100Mbps
					On (orange)		1000Mbps
	LAN 100BASE-TX (MMB)	Link/Act	Green		Off		Network not link
					Blinking in green		Network active
					On (green)		Network link
		Speed	Green/ Orange		Off		10Mbps
					On		100Mbps

(*1) Since MMB does not close its LAN port explicitly, the state where LAN port is disabled is not displayed.

TABLE F.29 LED list (3/3)

Component		LED type	Color	Quantity	Status	Description
OPL		System Power	Green		Off	Power off in all partitions
					On	- Power on in all partitions - PSU on, 12V feed
		System Alarm	Orange		Off	
					On	Error occurrence in cabinet
		System Location (ID)	Blue		Off	
					On	Identify cabinet
		CSS	Yellow		Off	
					On	Error in CSS component
PCI_Box		Power	Green		Off	PCI_Box power off
					On	PCI_Box power on
		Alarm	Orange		Off	PCI_Box normal
					On	Error in PCI_Box
		Location	Blue		Off	
					On	Component location
		IO_PSU_ CHECK (*1)	Orange		Off	IO_PSU normal
					Blinking	Error in IO_PSU
	PCI Express slot	Power	Green		Off	PCI Express slot power off
					Blinking	PCI Express hot replacement in progress
					On	PCI Express slot power on
		Alarm	Orange		Off	PCI Express slot normal
					Blinking	PCI Express slot location
					On	Error at PCI Express slot
	IO_PSU	AC	Green		Off	AC off or 5V SB output stopped
					On	AC on or 5V SB being output
		DC	Green		Off	12V output stopped
					On	12V being output
		CHECK	Orange		Off	IO_PSU normal
					On	Error at IO_PSU
	IO_FAN	Alarm	Orange		Off	IO_FAN normal
					On	Error in IO_ FAN

(*1) OR output of two IO_PSU CHECK LEDs.
If the CHECK LED of even one IO_PSU goes on, the IO_PSU_CHECK LED goes on.

F.4 Button and switch

PRIMEQUEST 2000 series comes equipped with below buttons and switches.

- OPL Location button
  When you push the Location button of OPL, Location LED turns on. Pushing this button again, Location LED turns off.
- DU Attention Button
  Although there is the Attention button in DU, it is not used. Nothing happens if you push this button.
- PCI_Box switch
  You can set 0 to 3 to PCI_Box as PCI_Box number by switch of PCI_Box. If multiple PCI_Boxes are connected in a partition, be sure to set different number to each PCI_Box so that the number of a PCI_Box is not same as that of other PCI_Boxes.
  Below PCI_Box numbers can be used in each model.

TABLE F.30 Usable PCI_Box number and models

PCI_Box number	Model		
	2400E	2800E	2800B (*1)
0	Usable	Usable	Not usable
1	Usable	Usable	Not usable
2	Usable	Usable	Not usable
3	Usable	Usable	Not usable

(*1) PCI_Box cannot be used in PRIMEQUEST 2800B.

Appendix G Component Mounting Conditions

This appendix describes the mounting conditions of components for the PRIMEQUEST 2000 series.

G.1 CPU

This section describes the number of CPUs that can be mounted and the criteria for mixing different types of CPU.

CPU mounting criteria

- SB with one CPU is allowed in only single SB partition. (*1)
- SB with two CPUs is allowed in single SB partition.
- Only SB with two CPUs is allowed in multiple SB partition.
- CPUs must be mounted starting from CPU#0 on the SB.
- If CPU mounting order is wrong, SB becomes to be error.
- An SB with no CPU mounted on it will cause an error.

(*1) For PRIMEQUEST 2800B, only SB with two CPUs is allowed in single SB partition.

The following lists the number of SBs and CPUs per partition for each model.

TABLE G.1 Numbers of SBs and CPUs per partition

Partition configuration	PRIMEQUEST 2400E	PRIMEQUEST 2800E	PRIMEQUEST 2800B
1 SB	1 or 2	1 or 2	2
2 SB	4	4	4
3 SB	Not supported	6	6
4 SB	Not supported	8	8

CPU mixing condition

- In a partition, all CPUs must have the same frequency, cache size, core number, power, QPI rate, and scale.
- In a system, CPUs which have different frequency, cache size and core number can be mounted.

G.2 DIMM

This section describes the number of DIMMs that can be mounted and the criteria for mixing different types of DIMM.

DIMM mounting conditions

- At least two DIMMs are required per CPU.
- Up to 24 DIMMs can be mounted per CPU.
- DIMMs must be mounted in the following units:
  In below table, ‘N’ means normal mode or performance mode, ‘M’ means full mirror mode or partial mirror mode, and ‘S’ means spare mode.

TABLE G.2 DIMM increment unit

DR	PCI address mode	SB Number (CPU number) per Partition	DIMM increment unit					
			1CPU/1SB			2CPU/1SB		
			N	M	S	N	M	S
Disable	Bus	1SB (1CPU) (*1)	2	4	6	N/A	N/A	N/A
		1SB (2CPU)	N/A	N/A	N/A	2	4	6

DR	PCI address mode	SB Number (CPU number) per Partition	DIMM increment unit					
			1CPU/1SB			2CPU/1SB		
			N	M	S	N	M	S
		2SB (4CPU)	N/A	N/A	N/A	2	4	6
		3SB (6CPU)	N/A	N/A	N/A	2	4	6
		4SB (8CPU)	N/A	N/A	N/A	2	4	6
	Segment	1SB (1CPU) (*1)	2	4	6	N/A	N/A	N/A
		1SB (2CPU)	N/A	N/A	N/A	2	4	6
		2SB (4CPU)	N/A	N/A	N/A	2	4	6
		3SB (6CPU)	N/A	N/A	N/A	2	4	6
		4SB (8CPU)	N/A	N/A	N/A	8	16	24
Enable	Bus	1SB (1CPU) (*1)	N/A	N/A	N/A	N/A	N/A	N/A
		1SB (2CPU)	N/A	N/A	N/A	N/A	N/A	N/A
		2SB (4CPU)	N/A	N/A	N/A	N/A	N/A	N/A
		3SB (6CPU)	N/A	N/A	N/A	N/A	N/A	N/A
		4SB (8CPU)	N/A	N/A	N/A	N/A	N/A	N/A
	Segment	1SB (1CPU) (*1)	4	8	12	N/A	N/A	N/A
		1SB (2CPU)	N/A	N/A	N/A	8	16	24
		2SB (4CPU)	N/A	N/A	N/A	8	16	24
		3SB (6CPU)	N/A	N/A	N/A	8	16	24
		4SB (8CPU)	N/A	N/A	N/A	8	16	24

N/A: Not available
(*1) PRIMEQUEST 2800B is excluded.

DIMM mixing criteria

- 8 GB and 16 GB DIMMs can be mounted in a single SB or partition.
- 32 GB and 64 GB DIMMs cannot be mixed with DIMMs of other sizes in an SB or partition.
- Identical DIMMs means those with the same size.

TABLE G.3 Relationship between DIMM size and mutual operability (within an SB)

DIMM size	8 GB	16 GB	32 GB	64 GB
8 GB	Supported	Supported	Not supported	Not supported
16 GB	Supported	Supported	Not supported	Not supported
32 GB	Not supported	Not supported	Supported	Not supported
64 GB	Not supported	Not supported	Not supported	Supported

TABLE G.4 Relationship between DIMM size and mutual operability (within a partition)

DIMM size	8 GB	16 GB	32 GB	64 GB
8 GB	Supported	Supported	Not supported	Not supported
16 GB	Supported	Supported	Not supported	Not supported
32 GB	Not supported	Not supported	Supported	Not supported
64 GB	Not supported	Not supported	Not supported	Supported

TABLE G.5 Relationship between DIMM size and mutual operability (within a cabinet)

DIMM size	8 GB	16 GB	32 GB	64 GB
8 GB	Supported	Supported	Supported	Supported
16 GB	Supported	Supported	Supported	Supported
32 GB	Supported	Supported	Supported	Supported
64 GB	Supported	Supported	Supported	Supported

DIMM mounting order and DIMM mixed mounting condition

The order of DIMM installation and the condition of DIMM mixed installation are shown below.
In tables of DIMM mounting order, DIMMs are installed in order from one with small number.
In tables of DIMM mixed mounting condition, the same symbol indicates the same DIMM.
DIMM mounting order and DIMM mixed mounting condition are decided depending on CPU number per the partition, whether PCI address mode is Segment or Bus and whether DR is enabled or disabled. Below table shows which tables you should see in each case.

TABLE G.6 DIMM mounting order and DIMM mixed mounting condition in each configuration

DR	PCI address mode	SB Number (CPU number) per Partition	DIMM mounting order		DIMM mixed mounting condition	
			1CPU/1SB	2CPU/1SB	1CPU/1SB	2CPU/1SB
Disable	Bus	1SB (1CPU) (*1)	TABLE G.7TABLE G.7 DIMM mounting order at 1CPU/1SB (*1)	N/A	TABLE G.9	N/A
		1SB (2CPU)	N/A	TABLE G.8	N/A	TABLE G.10
		2SB (4CPU)	N/A	TABLE G.8	N/A	TABLE G.10
		3SB (6CPU)	N/A	TABLE G.8	N/A	TABLE G.10
		4SB (8CPU)	N/A	TABLE G.8	N/A	TABLE G.10
	Segment	1SB (1CPU) (*1)	TABLE G.7	N/A	TABLE G.9	N/A
		1SB (2CPU)	N/A	TABLE G.8	N/A	TABLE G.10
		2SB (4CPU)	N/A	TABLE G.8	N/A	TABLE G.10
		3SB (6CPU)	N/A	TABLE G.8	N/A	TABLE G.10
		4SB (8CPU)	N/A	TABLE G.12	N/A	TABLE G.14
Enable	Bus	1SB (1CPU) (*1)	N/A	N/A	N/A	N/A
		1SB (2CPU)	N/A	N/A	N/A	N/A
		2SB (4CPU)	N/A	N/A	N/A	N/A
		3SB (6CPU)	N/A	N/A	N/A	N/A
		4SB (8CPU)	N/A	N/A	N/A	N/A
	Segment	1SB (1CPU) (*1)	TABLE G.11	N/A	TABLE G.13	N/A
		1SB (2CPU)	N/A	TABLE G.12	N/A	TABLE G.14
		2SB (4CPU)	N/A	TABLE G.12	N/A	TABLE G.14
		3SB (6CPU)	N/A	TABLE G.12	N/A	TABLE G.14
		4SB (8CPU)	N/A	TABLE G.12	N/A	TABLE G.14

N/A: Not available
(*1) PRIMEQUEST 2800B is excluded.

TABLE G.7 DIMM mounting order at 1CPU/1SB (*1)

	CPU#0							
DIMM Slot#	0A0	0A3	0B0	0B3	0C0	0C3	0D0	0D3
	0A1	0A4	0B1	0B4	0C1	0C4	0D1	0D4
	0A2	0A5	0B2	0B5	0C2	0C5	0D2	0D5
Normal (Performance)	1	1	3	3	2	2	4	4
	5	5	7	7	6	6	8	8
	9	9	11	11	10	10	12	12
Full or Partial Mirror	1	1	1	1	2	2	2	2
	3	3	3	3	4	4	4	4
	5	5	5	5	6	6	6	6
Spare	1	1	3	3	2	2	4	4
	1	1	3	3	2	2	4	4
	1	1	3	3	2	2	4	4

(*1) See 'TABLE G.11 DIMM mounting order at 1CPU/1SB when a Partition includes 8 sockets with PCI Address Mode = Segment Mode, or when DR is enabled in a Partition' when a Partition includes 4SBs with PCI Address Mode = Segment Mode, or DR is enabled in a Partition.

TABLE G.8 DIMM mounting order at 2CPU/1SB (*1)

	CPU#0								CPU#1							
DIMM Slot#	0A0	0A3	0B0	0B3	0C0	0C3	0D0	0D3	1A0	1A3	1B0	1B3	1C0	1C3	1D0	1D3
	0A1	0A4	0B1	0B4	0C1	0C4	0D1	0D4	1A1	1A4	1B1	1B4	1C1	1C4	1D1	1D4
	0A2	0A5	0B2	0B5	0C2	0C5	0D2	0D5	1A2	1A5	1B2	1B5	1C2	1C5	1D2	1D5
Normal (Performance)	1	1	4	4	2	2	6	6	1	1	5	5	3	3	7	7
	8	8	12	12	10	10	14	14	9	9	13	13	11	11	15	15
	16	16	20	20	18	18	22	22	17	17	21	21	19	19	23	23
Full or Partial Mirror	1	1	1	1	2	2	2	2	1	1	1	1	3	3	3	3
	4	4	4	4	6	6	6	6	5	5	5	5	7	7	7	7
	8	8	8	8	10	10	10	10	9	9	9	9	11	11	11	11
Spare	1	1	4	4	2	2	6	6	1	1	5	5	3	3	7	7
	1	1	4	4	2	2	6	6	1	1	5	5	3	3	7	7
	1	1	4	4	2	2	6	6	1	1	5	5	3	3	7	7

(*1) See 'TABLE G.12 DIMM mounting order at 2CPU/1SB when a Partition includes 8 sockets with PCI Address Mode = Segment Mode, or when DR is enabled in a Partition' when a Partition includes 4SBs with PCI Address Mode = Segment Mode, or DR is enabled in a Partition.

TABLE G.9 DIMM mixed mounting condition at 1CPU/1SB (*1)

	CPU#0							
DIMM Slot#	0A0	0A3	0B0	0B3	0C0	0C3	0D0	0D3
	0A1	0A4	0B1	0B4	0C1	0C4	0D1	0D4
	0A2	0A5	0B2	0B5	0C2	0C5	0D2	0D5
Normal (Performance)	□	□	○	○	△	△	☆	☆
	□	□	○	○	△	△	☆	☆
	□	□	○	○	△	△	☆	☆
Full or Partial Mirror	□	□	□	□	△	△	△	△
	□	□	□	□	△	△	△	△
	□	□	□	□	△	△	△	△
Spare	□	□	○	○	△	△	☆	☆
	□	□	○	○	△	△	☆	☆
	□	□	○	○	△	△	☆	☆

(*1) See ‘

TABLE G.13 DIMM mixed mounting condition at 1CPU/1SB when a Partition includes 8 sockets with PCI Address Mode = Segment Mode, or when DR is enabled in a Partition' when a Partition includes 4SBs with PCI Address Mode = Segment Mode, or DR is enabled in a Partition.

TABLE G.10 DIMM mixed mounting condition at 2CPU/1SB (*1)

	CPU#0								CPU#1							
DIMM Slot#	0A0	0A3	0B0	0B3	0C0	0C3	0D0	0D3	1A0	1A3	1B0	1B3	1C0	1C3	1D0	1D3
	0A1	0A4	0B1	0B4	0C1	0C4	0D1	0D4	1A1	1A4	1B1	1B4	1C1	1C4	1D1	1D4
	0A2	0A5	0B2	0B5	0C2	0C5	0D2	0D5	1A2	1A5	1B2	1B5	1C2	1C5	1D2	1D5
Normal (Performance)	□	□	○	○	△	△	☆	☆	■	■	●	●	▲	▲	★	★
	□	□	○	○	△	△	☆	☆	■	■	●	●	▲	▲	★	★
	□	□	○	○	△	△	☆	☆	■	■	●	●	▲	▲	★	★
Full or Partial Mirror	□	□	□	□	△	△	△	△	■	■	■	■	▲	▲	▲	▲
	□	□	□	□	△	△	△	△	■	■	■	■	▲	▲	▲	▲
	□	□	□	□	△	△	△	△	■	■	■	■	▲	▲	▲	▲
Spare	□	□	○	○	△	△	☆	☆	■	■	●	●	▲	▲	★	★
	□	□	○	○	△	△	☆	☆	■	■	●	●	▲	▲	★	★
	□	□	○	○	△	△	☆	☆	■	■	●	●	▲	▲	★	★

(*1) See 'TABLE G.14 DIMM mixed mounting condition at 2CPU/1SB when a Partition includes 8 sockets with PCI Address Mode = Segment Mode, or when DR is enabled in a Partition' when a Partition includes 4SBs with PCI Address Mode = Segment Mode, or DR is enabled in a Partition.

TABLE G.11 DIMM mounting order at 1CPU/1SB when a Partition includes 8 sockets with PCI Address Mode = Segment Mode, or when DR is enabled in a Partition

	CPU#0							
DIMM Slot#	0A0	0A3	0B0	0B3	0C0	0C3	0D0	0D3
	0A1	0A4	0B1	0B4	0C1	0C4	0D1	0D4
	0A2	0A5	0B2	0B5	0C2	0C5	0D2	0D5
Normal (Performance)	1	1	3	3	2	2	4	4
	5	5	7	7	6	6	8	8
	9	9	11	11	10	10	12	12
Full or Partial Mirror	1	1	1	1	2	2	2	2
	3	3	3	3	4	4	4	4
	5	5	5	5	6	6	6	6
Spare	1	1	3	3	2	2	4	4
	1	1	3	3	2	2	4	4
	1	1	3	3	2	2	4	4

TABLE G.12 DIMM mounting order at 2CPU/1SB when a Partition includes 8 sockets with PCI Address Mode = Segment Mode, or when DR is enabled in a Partition

	CPU#0								CPU#1							
DIMM Slot#	0A0	0A3	0B0	0B3	0C0	0C3	0D0	0D3	1A0	1A3	1B0	1B3	1C0	1C3	1D0	1D3
	0A1	0A4	0B1	0B4	0C1	0C4	0D1	0D4	1A1	1A4	1B1	1B4	1C1	1C4	1D1	1D4
	0A2	0A5	0B2	0B5	0C2	0C5	0D2	0D5	1A2	1A5	1B2	1B5	1C2	1C5	1D2	1D5
Normal (Performance)	1	1	4	4	2	2	6	6	1	1	5	5	3	3	7	7
	8	8	12	12	10	10	14	14	9	9	13	13	11	11	15	15
	16	16	20	20	18	18	22	22	17	17	21	21	19	19	23	23
Full or Partial Mirror	1	1	1	1	2	2	2	2	1	1	1	1	3	3	3	3
	4	4	4	4	6	6	6	6	5	5	5	5	7	7	7	7
	8	8	8	8	10	10	10	10	9	9	9	9	11	11	11	11
Spare	1	1	4	4	2	2	6	6	1	1	5	5	3	3	7	7
	1	1	4	4	2	2	6	6	1	1	5	5	3	3	7	7
	1	1	4	4	2	2	6	6	1	1	5	5	3	3	7	7

TABLE G.13 DIMM mixed mounting condition at 1CPU/1SB when a Partition includes 8 sockets with PCI Address Mode = Segment Mode, or when DR is enabled in a Partition

	CPU#0							
DIMM Slot#	0A0	0A3	0B0	0B3	0C0	0C3	0D0	0D3
	0A1	0A4	0B1	0B4	0C1	0C4	0D1	0D4
	0A2	0A5	0B2	0B5	0C2	0C5	0D2	0D5
Normal (Performance)	□	□	○	○	△	△	☆	☆
	□	□	○	○	△	△	☆	☆
	□	□	○	○	△	△	☆	☆
Full or Partial Mirror	□	□	□	□	△	△	△	△
	□	□	□	□	△	△	△	△
	□	□	□	□	△	△	△	△
Spare	□	□	○	○	△	△	☆	☆
	□	□	○	○	△	△	☆	☆
	□	□	○	○	△	△	☆	☆

TABLE G.14 DIMM mixed mounting condition at 2CPU/1SB when a Partition includes 8 sockets with PCI Address Mode = Segment Mode, or when DR is enabled in a Partition

	CPU#0								CPU#1							
DIMM Slot#	0A0	0A3	0B0	0B3	0C0	0C3	0D0	0D3	1A0	1A3	1B0	1B3	1C0	1C3	1D0	1D3
	0A1	0A4	0B1	0B4	0C1	0C4	0D1	0D4	1A1	1A4	1B1	1B4	1C1	1C4	1D1	1D4
	0A2	0A5	0B2	0B5	0C2	0C5	0D2	0D5	1A2	1A5	1B2	1B5	1C2	1C5	1D2	1D5
Normal (Performance)	□	□	○	○	△	△	☆	☆	■	■	●	●	▲	▲	★	★
	□	□	○	○	△	△	☆	☆	■	■	●	●	▲	▲	★	★
	□	□	○	○	△	△	☆	☆	■	■	●	●	▲	▲	★	★
Full or Partial Mirror	□	□	□	□	△	△	△	△	■	■	■	■	▲	▲	▲	▲
	□	□	□	□	△	△	△	△	■	■	■	■	▲	▲	▲	▲
	□	□	□	□	△	△	△	△	■	■	■	■	▲	▲	▲	▲
Spare	□	□	○	○	△	△	☆	☆	■	■	●	●	▲	▲	★	★
	□	□	○	○	△	△	☆	☆	■	■	●	●	▲	▲	★	★
	□	□	○	○	△	△	☆	☆	■	■	●	●	▲	▲	★	★

G.3 Configuration when using 100 V PSU

PRIMEQUEST 2000 series supports 100 V power supply in case of only PSU_S. Since power efficiency decrease when using 100V PSU, maximum quantity of component may decrease in a system.

G.4 Available internal I/O ports

The following table lists the number of available internal I/O ports.

TABLE G.15 Available internal I/O ports and the quantities

Internal I/O		No.	Remarks
SB	USB	4	Home SB only
	VGA	1	Home SB only
	HDD/SSD	4	Home SB only when DR enabled.
IOU_1GbE	GbE	2	
IOU_10GbE	10GbE	2	
DU	HDD/SSD	4	

G.5 Legacy BIOS Compatibility (CSM)

The PRIMEQUEST 2000 series uses the UEFI, which is firmware that provides the BIOS emulation function. Currently, the following legacy BIOS restrictions are known:

- Option ROM area restriction: The number of PXE-enabled cards that can operate as boot devices is restricted to four.
- I/O space restriction: In a legacy BIOS environment, I/O space is required on a boot device.

Note
In a CSM environment, I/O space must be allocated to a boot device.

G.6 Rack Mounting

For details on installation in a 19-inch rack, see the *PRIMEQUEST 2000 Series Hardware Installation Manual* (C122-H004EN).

G.7 Installation Environment

For details on the environmental conditions for PRIMEQUEST 2000 series installations, see the PRIMEQUEST 2000 Series Hardware Installation Manual (C122-H004EN).

G.8 NIC (Network Interface Card)

Note the following precautions on mounting of a NIC (network interface card).
Notes

- We recommend specifying the members of teaming between LANs of the same type. (We recommend teaming between cards of the same type in the onboard LAN.)
- If the teaming is specified with different types of LAN, the scaling function on the receive side may be off because of differences in the scaling function.
  Consequently, the balance of receive traffic may not be optimized, but this is not a problem for normal operation.
- Depending on the Intel PROSet version used at the time of teaming configuration, a warning may be output about scaling on the receive side being disabled for the above-described reasons. In this event, simply click the [OK] button.
  For details on the scaling function on the receive side or other precautions, see the help for Intel PROSet or check the information at [Device Manager] - [Properties *of the target LAN*] - [Details] - [Receive-Side Scaling].

- For the WOL (Wake on LAN) support conditions of operating systems, see the respective operating system manuals and restrictions. For remote power control in an operating system that does not support WOL, perform operations from the MMB Web-UI.

Appendix H Tree Structure of the MIB Provided with the PRIMEQUEST 2000 Series

This appendix describes the tree structure of the MIB provided with the PRIMEQUEST 2000 series.
If SVS agent options are installed, MIB information of Agent can be acquired by SNMP service on the partition.
For details on the MIB tree of SVS, see the MIB file of SVS.

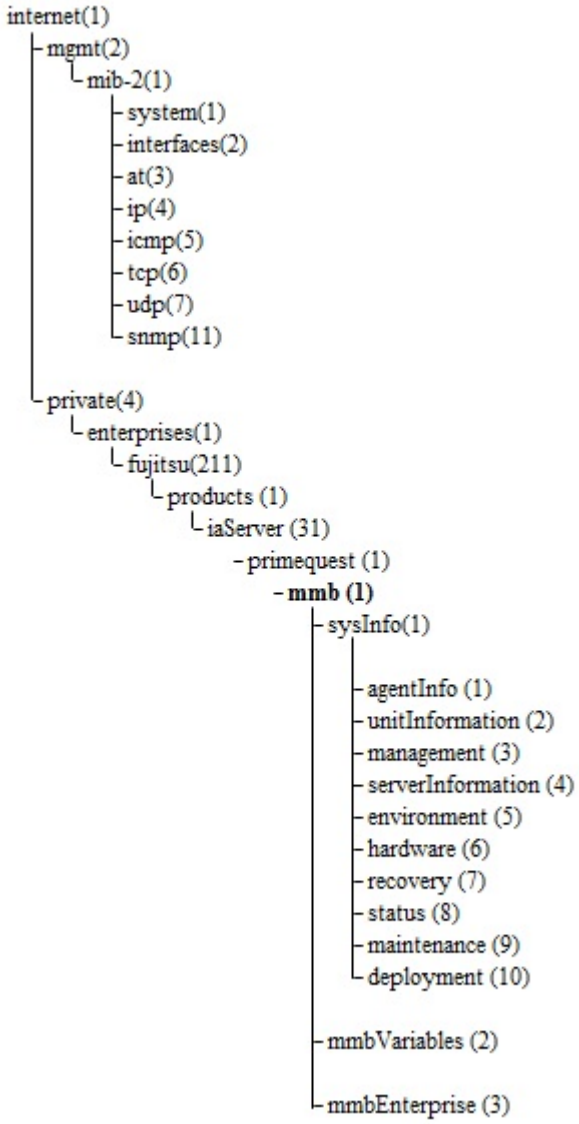
H.1 MIB Tree Structure

MIB information under "mmb(1)" is provided by the MMB firmware. You can acquire it by accessing the MMB. You can also acquire the standard MIB information from the MMB.

Note

The PRIMEQUEST 2000 series uses the SNMP function of the MMB to recognize changes in the partition state when each partition is started or stopped. For an MIB request received at this time from an external manager (e.g., Systemwalker Centric Manager), the MMB temporarily returns an error or time-out. In this case, information can be obtained by reissuing the MIB request.
The following shows the MIB tree structure.

FIGURE H.1 MIB tree structure



H.2 MIB File Contents

The following table lists the contents of MIB files.

TABLE H.1 MIB file contents

	MIB file	Purpose	Partition operating system	Information source	Description
MMB-MIBs/	MMB-COM-MIB.txt	Reference	-	MMB firmware	MIB information such as the hardware configuration of the entire cabinet
	MMB-ComTrap-MIB.txt	Monitoring	-		MIB information for hardware failure monitoring across the entire cabinet (MMB SEL event)

Appendix I Windows Shutdown Settings

This appendix describes how to set (arbitrarily) Windows to shut down.

I.1 Shutdown From MMB Web-UI

Windows shutdown from the MMB Web-UI requires ServerView Agent.
For details on how to set ServerView Agent, contact the distributor where you purchased your product or your sales representative.

Appendix J How to Confirm Firmware of SAS RAID Controller Card

This section explains how to confirm the firmware of I/O device.

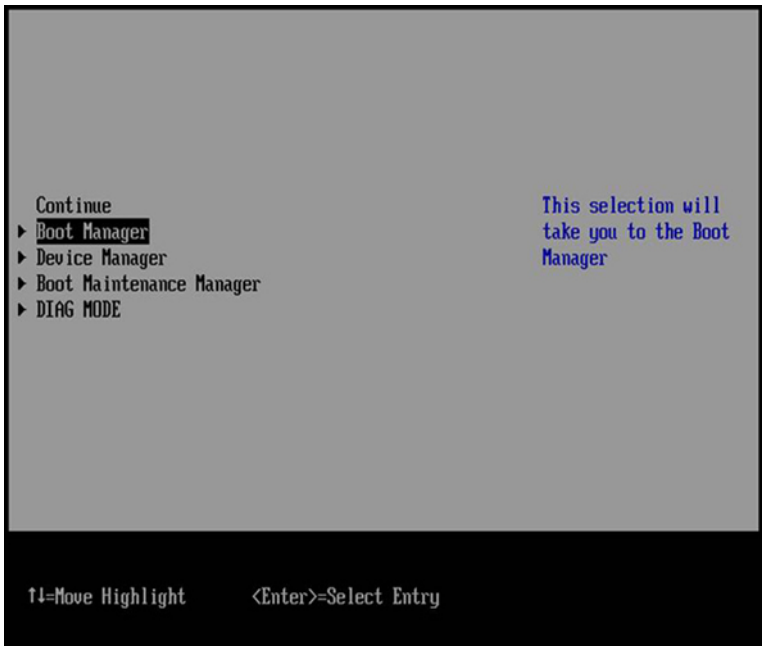
J.1 How to confirm firmware version of SAS RAID controller card

You can confirm firmware version of SAS RAID controller card by WebBIOS and ServerView RAID.
Note
Below figures are sample window. Contents such as version shown in figures may differ from that of actual windows in your system.

Confirming by WebBIOS

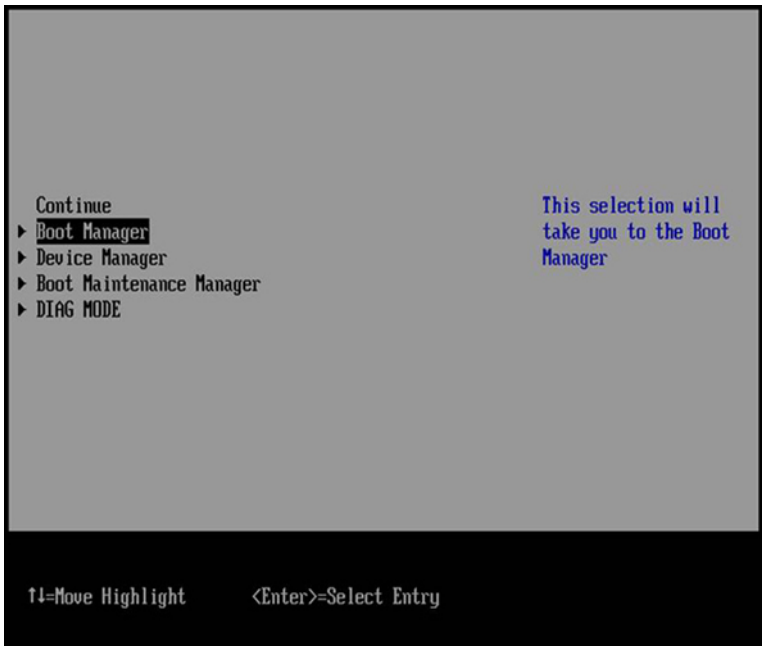
1. Select [Force boot into EFI Boot Manager] from [Boot Selector] in [Power Control] window of MMB Web-UI.
   Partition is powered on and Boot Manager front page appears.

FIGURE J.1 Boot Manager front page (1)



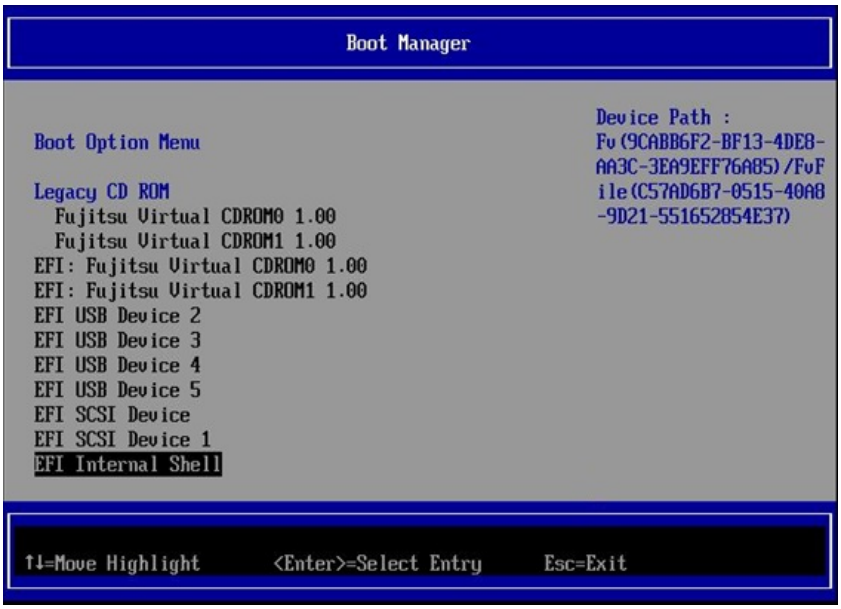
2. Select [Boot Manager] and press [Enter] key. [Boot Manager] window appears.

FIGURE J.2 Boot Manager front page (2)



3. Select [EFI Internal Shell] and press [Enter] key. UEFI Shell starts up.

FIGURE J.3 Boot Manager menu



4. Input below command on UEFI Shell.

```
Shell> drivers
```

5. Driver list appears.

FIGURE J.4 Driver list

EFI Shell version 2.31 [0.38]
Current running mode 1.1.2
Device mapping table
blk0 :Removable BlockDevice - Alias (null)
PcieRoot(0x0)/Pci(0x1A,0x0)/USB(0x0,0x0)/USB(0x4,0x0)/Unit(0x0)
blk1 :Removable BlockDevice - Alias (null)
PcieRoot(0x0)/Pci(0x1A,0x0)/USB(0x0,0x0)/USB(0x4,0x0)/Unit(0x1)
blk2 :Removable BlockDevice - Alias (null)
PcieRoot(0x0)/Pci(0x1A,0x0)/USB(0x0,0x0)/USB(0x4,0x0)/Unit(0x2)
blk3 :Removable BlockDevice - Alias (null)
PcieRoot(0x0)/Pci(0x1A,0x0)/USB(0x0,0x0)/USB(0x4,0x0)/Unit(0x3)
blk4 :Removable BlockDevice - Alias (null)
PcieRoot(0x0)/Pci(0x1A,0x0)/USB(0x0,0x0)/USB(0x4,0x0)/Unit(0x4)
blk5 :Removable BlockDevice - Alias (null)
PcieRoot(0x0)/Pci(0x1A,0x0)/USB(0x0,0x0)/USB(0x4,0x0)/Unit(0x5)
blk6 :Removable BlockDevice - Alias (null)
PcieRoot(0x0)/Pci(0x1C,0x0)/Pci(0x0,0x0)/Ctrl(0x0)/Scsi(0x1,0x0)
blk7 :Removable BlockDevice - Alias (null)
PcieRoot(0x0)/Pci(0x1C,0x0)/Pci(0x0,0x0)/Ctrl(0x0)/Scsi(0x2,0x0)
Press ESC in 1 seconds to skip startup.nsh, any other key to continue.
Shell> drivers

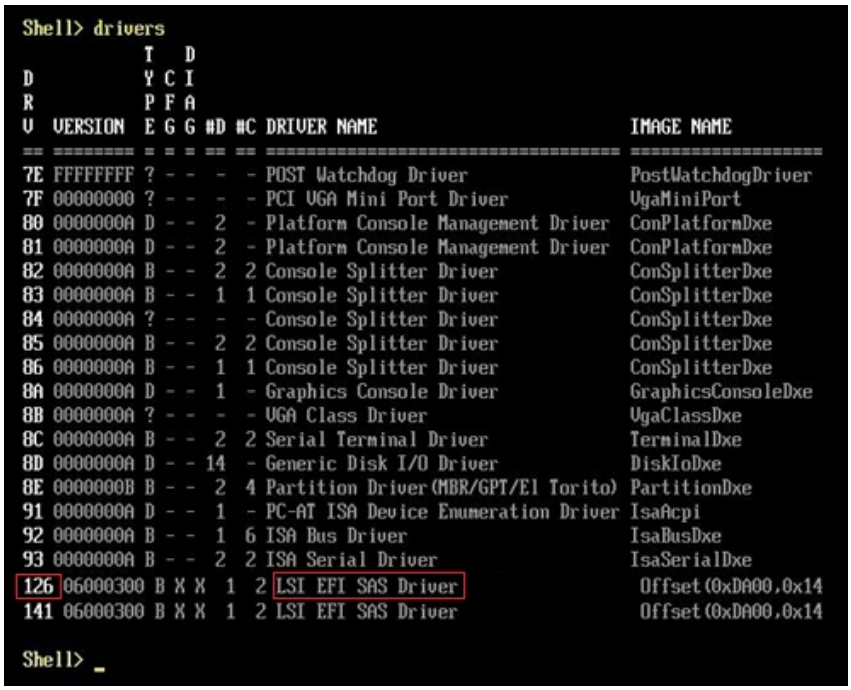
For details on UEFI operation, see "*PRIMEQUEST 2000 series User Interface Operating Instructions*" (C122-E176EN) and "*PRIMEQUEST 2000 series Tool Reference*" (C122-E177EN).

Note

If driver list does not fall within window, input 'drivers -b'. Driver list is shown by a page.

6. Check the number of UEFI driver and the number of LSI EFI SAS Driver.
   In below example, the number of UEFI driver is '126'.

FIGURE J.5 drivers command of UEFI Shell

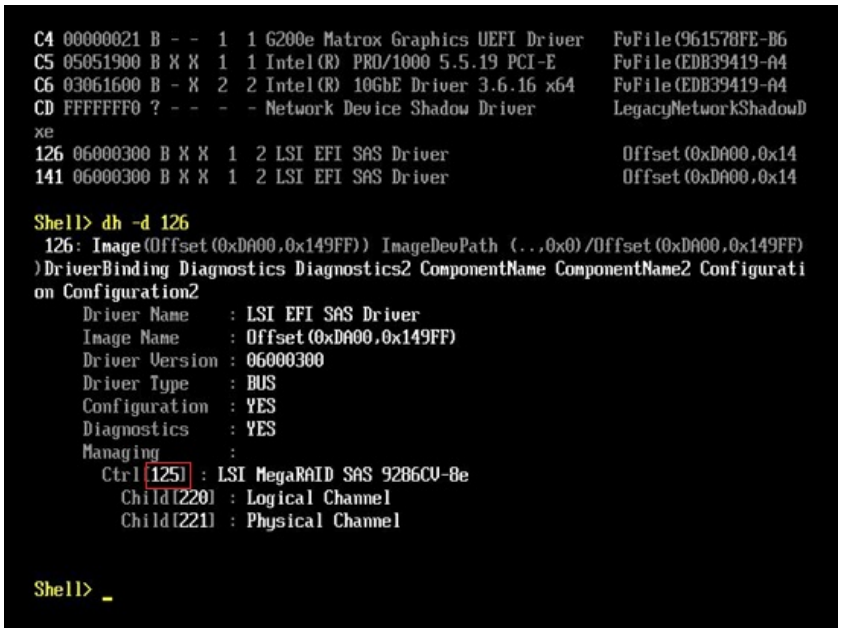

Shell> drivers
T D
D Y C I
R P F A
V VERSION E G G #D #C DRIVER NAME IMAGE NAME
7E FFFFFFFF ? - - - - POST Watchdog Driver PostWatchdogDriver
7F 00000000 ? - - - - PCI VGA Mini Port Driver VgaMiniPort
80 0000000A D - - 2 - Platform Console Management Driver ConPlatformDxe
81 0000000A D - - 2 - Platform Console Management Driver ConPlatformDxe
82 0000000A B - - 2 2 Console Splitter Driver ConSplitterDxe
83 0000000A B - - 1 1 Console Splitter Driver ConSplitterDxe
84 0000000A ? - - - - Console Splitter Driver ConSplitterDxe
85 0000000A B - - 2 2 Console Splitter Driver ConSplitterDxe
86 0000000A B - - 1 1 Console Splitter Driver ConSplitterDxe
8A 0000000A D - - 1 - Graphics Console Driver GraphicsConsoleDxe
8B 0000000A ? - - - - VGA Class Driver VgaClassDxe
8C 0000000A B - - 2 2 Serial Terminal Driver TerminalDxe
8D 0000000A D - - 14 - Generic Disk I/O Driver DiskIoDxe
8E 0000000B B - - 2 4 Partition Driver(MBR/GPT/El Torito) PartitionDxe
91 0000000A D - - 1 - PC-AT ISA Device Enumeration Driver IsaAcpi
92 0000000A B - - 1 6 ISA Bus Driver IsaBusDxe
93 0000000A B - - 2 2 ISA Serial Driver IsaSerialDxe
126 06000300 B X X 1 2 LSI EFI SAS Driver Offset(0xDA00,0x14
141 06000300 B X X 1 2 LSI EFI SAS Driver Offset(0xDA00,0x14
Shell> _

7. Execute dh command and check the controller number of 'LSI MegaRaid SAS Control'

```
Shell> dh -d 126
```

In below example, the controller number is '125'.

FIGURE J.6 dh command of UEFI Shell

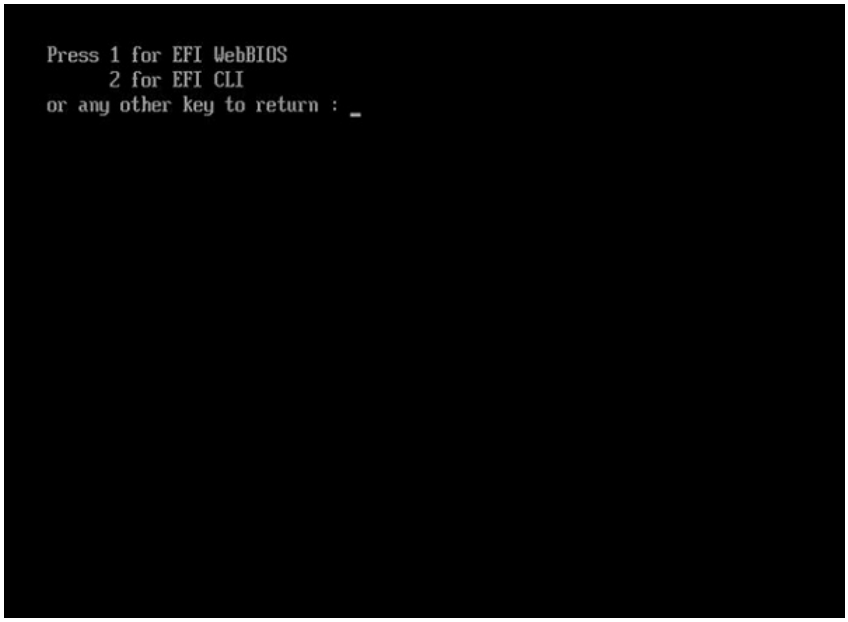

C4 00000021 B - - 1 1 G200e Matrox Graphics UEFI Driver FvFile(961578FE-B6
C5 05051900 B X X 1 1 Intel(R) PRO/1000 5.5.19 PCI-E FvFile(EDB39419-A4
C6 03061600 B - X 2 2 Intel(R) 10GbE Driver 3.6.16 x64 FvFile(EDB39419-A4
CD FFFFFFF0 ? - - - - Network Device Shadow Driver LegacyNetworkShadowD
xe
126 06000300 B X X 1 2 LSI EFI SAS Driver Offset(0xDA00,0x14
141 06000300 B X X 1 2 LSI EFI SAS Driver Offset(0xDA00,0x14
Shell> dh -d 126
126: Image(Offset(0xDA00,0x149FF)) ImageDevPath (..,0x0)/Offset(0xDA00,0x149FF)
)DriverBinding Diagnostics Diagnostics2 ComponentName ComponentName2 Configurati
on Configuration2
Driver Name : LSI EFI SAS Driver
Image Name : Offset(0xDA00,0x149FF)
Driver Version : 06000300
Driver Type : BUS
Configuration : YES
Diagnostics : YES
Managing :
Ctrl[125] : LSI MegaRAID SAS 9286CV-8e
Child[220] : Logical Channel
Child[221] : Physical Channel
Shell> _

8. Execute the drvcfg -s XX YY command.
   Specify the following for [XX] and [YY].
   - XX: UEFI driver number confirmed in step 2
   - YY: Controller number confirmed in step 3

```
Shell> drvcfg -s 126 125
```

9. The window where you select either EFI WebBIOS menu or EFI CLI menu appears. Select [1 for EFI WebBIOS].

FIGURE J.7 selection of EFI WebBIOS / EFI CLI



10. WebBIOS starts up. The list of mounted RAID controller is shown in [Adapter Selection] window. [Type] shows the name of RAID controller.

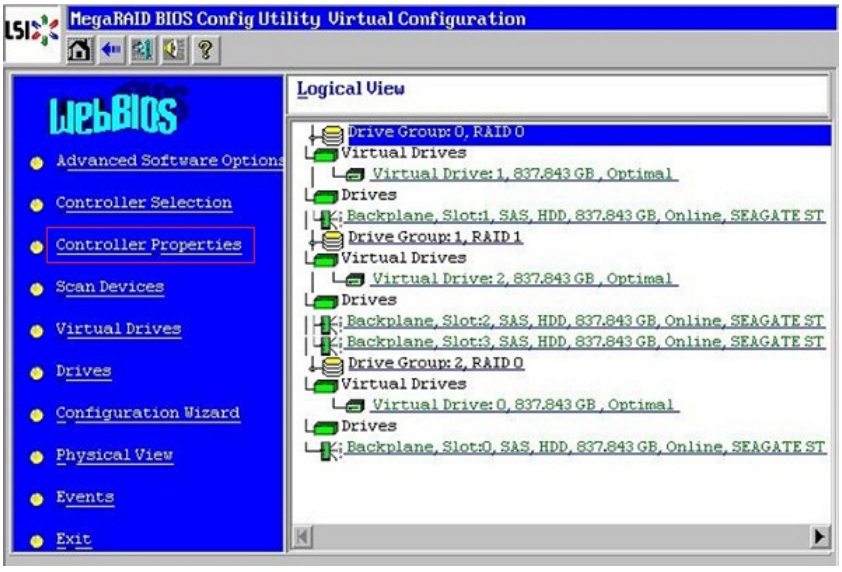
FIGURE J.8 [Adapter Selection] window of WebBIOS (1)

11. Select relevant RAID controller by [Adapter No.] radio button and click [Start] button.

FIGURE J.9 [Adapter Selection] window of WebBIOS (2)

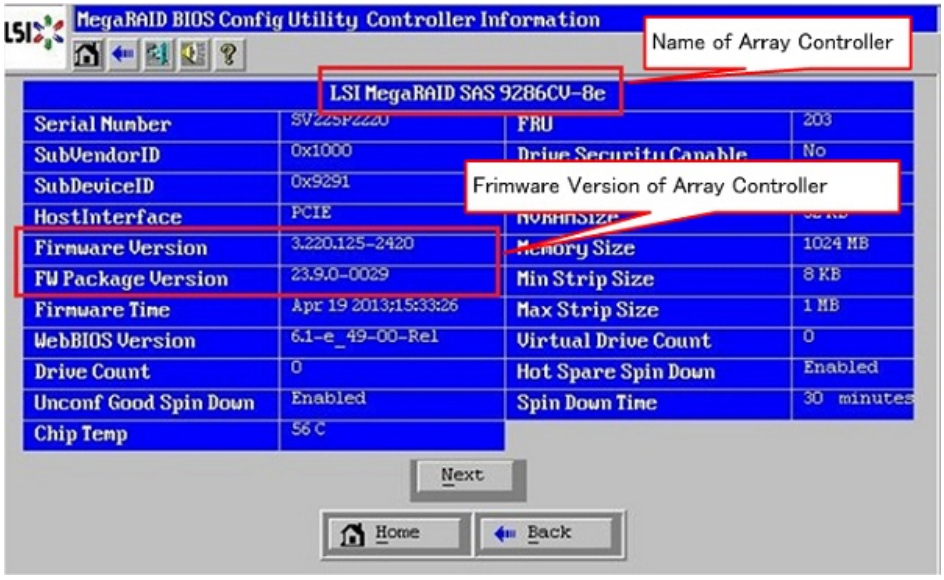
12. Click [Controller Properties] in [HOME] window of WebBIOS.

FIGURE J.10 [HOME] window of WebBIOS



13. Check current version of firmware. [Firmware Version] or [FW Package Version] shows the firmware version.

FIGURE J.11 [Controller Properties] window of WebBIOS



If multiple MegaRAID SAS RAID controller is mounted, click [Controller Selection] in [HOME] window. Go back to step 11 and check firmware version of remaining MegaRAID SAS RAID controller by taking same steps.

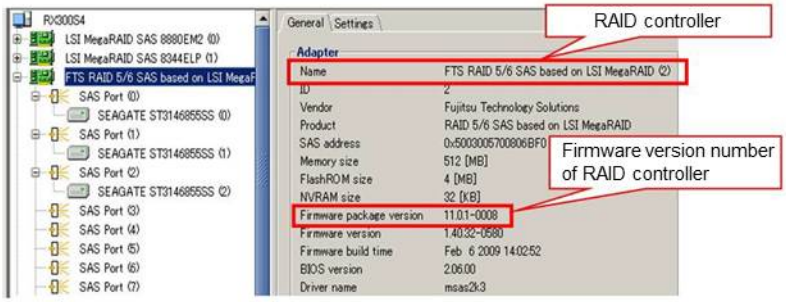
Note

When click [Home] button, go back to [HOME] window.

Confirming by ServerView RAID

1. Start the system and log in to the OS.
2. Start the ServiewView RAID Manager, connect it to the target server, and log in.
3. The account to be used for the login can be either administrator authority or user authority.
   From the tree view, select the target array controller.
4. The firmware version number is displayed in the [General] tab in the object window (right pane in the window).
   The part to be referred varies with the used RAID controller. Check the part for the selected array controller.

FIGURE J.12 [General] tab in the ServiewView RAID Manager



If multiple MegaRAID SAS RAID controller is mounted, click [Controller Selection] in [HOME] window. Go back to step 3 and check firmware version of remaining MegaRAID SAS RAID controller by taking same steps.

J.2 How to confirm firmware version of SAS card

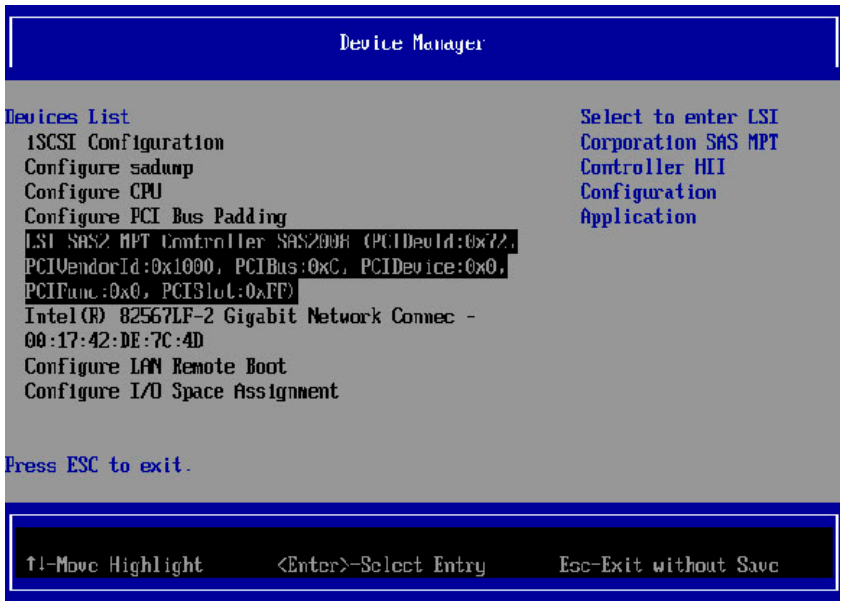
Below steps show how to confirm firmware version of dual channel SAS card (PCI Express card).

1. Select [Device Manager] in menu and press [Enter] key.

FIGURE J.13 Menu window

2. Select [LSI SAS2 MPT Controller SAS2008] from [Device List] in [Device Manager] window.

FIGURE J.14 Device List in [Device Manager] window

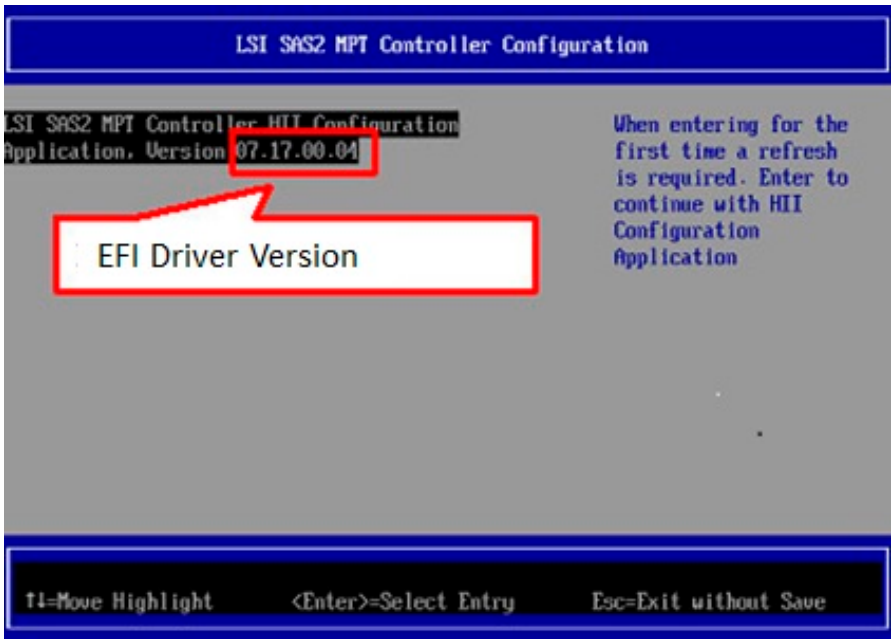


Note
If [LSI SAS2 MPT Controller SAS2008] is not shown, firmware version is below value:

- Firmware version: 05.00.13.00
- EFI driver version: 04.30.03.00

3. Check version of EFI driver in [LSI SAS2 MPT Controller Configuration] window.

FIGURE J.15 EFI driver version in [LSI SAS2 MPT Controller Configuration]

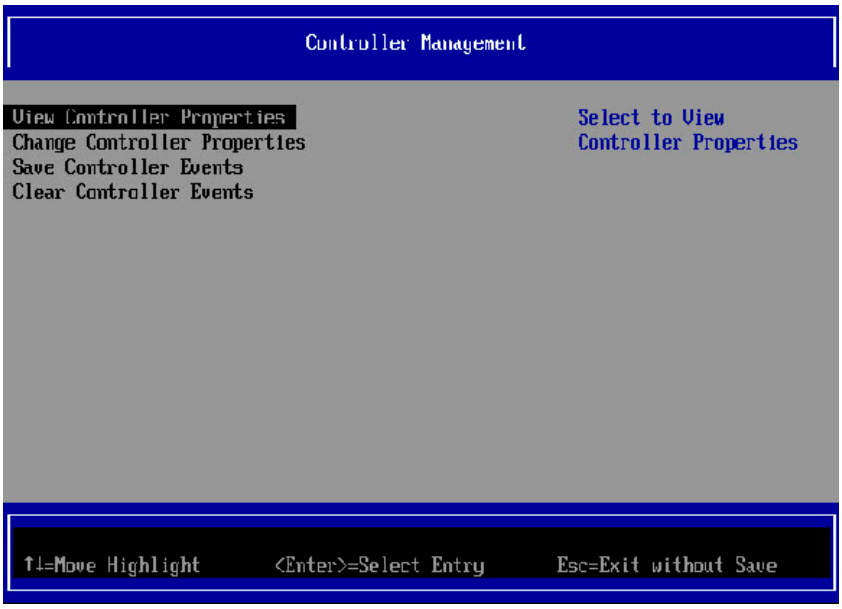

LSI SAS2 MPT Controller Configuration
LSI SAS2 MPT Controller HII Configuration
Application, Version 07.17.00.04
EFI Driver Version
When entering for the first time a refresh is required. Enter to continue with HII Configuration Application
↑↓=Move Highlight
<Enter>=Select Entry
Esc=Exit without Save

4. After confirming version, select [LSI SAS2 MPT Controller HII Configuration Application] and press [Enter] key.
5. Select [Controller Management] in [Configuration Options] window and press [Enter] key.

FIGURE J.16 [Configuration Options] window

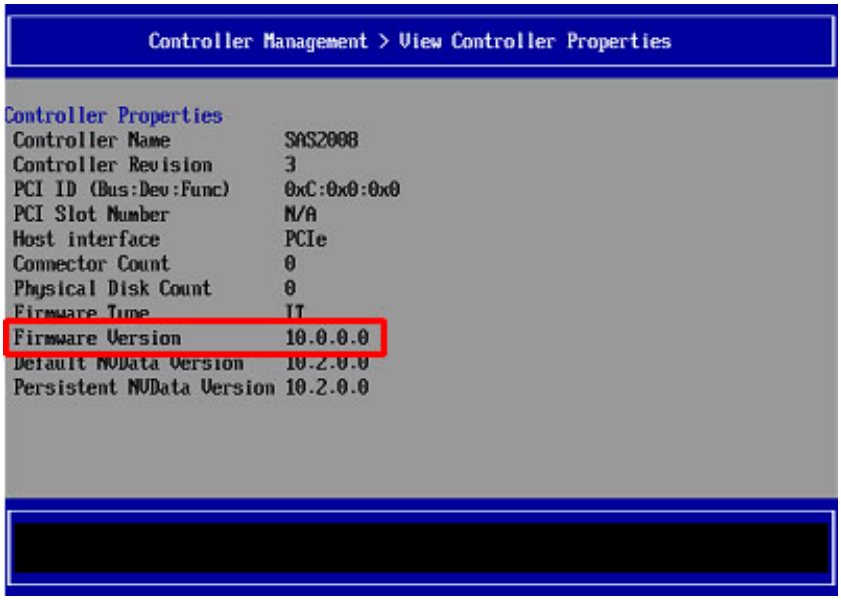
6. Select [View Controller Properties] in [Controller Management] window and press [Enter] key.

FIGURE J.17 [Controller Management] window



7. Check firmware version in [View Controller Properties] window.

FIGURE J.18 [View Controller Properties] window



Note
Press [Esc] key sometimes and go back to top menu.

J.3 How to confirm firmware version and UEFI driver version of FC card

Below steps show how to confirm firmware version and UEFI driver version of FC card.
Note
Firmware and UEFI driver of FC card have to be same one within a partition. If there is a FC card with different version from that of other FC cards, update firmware version and driver version of the FC card to the version of other FC cards in a partition.

J.3.1 How to confirm firmware version for FC card made by Qlogic

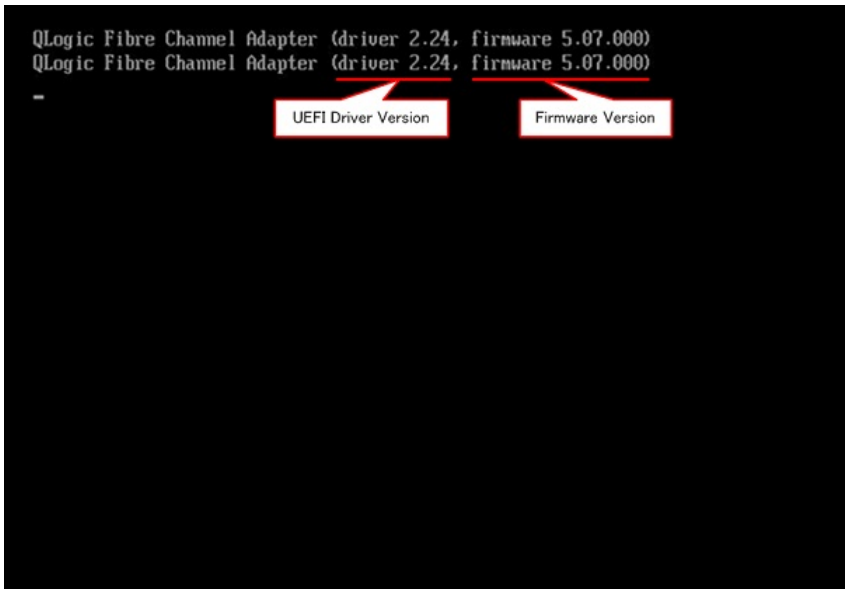
Confirming UEFI driver version and firmware version

1. Select [Force boot into EFI Boot Manager] by [Boot Selection] in [Power Control] window of MMB Web-UI. Partition is powered on and logo of FUJITSU appears.
   Note
   For a FC card made by Qlogic, you can confirm the firmware version only when a partition starts up.

FIGURE J.19 FUJITSU logo window

2. UEFI driver version and firmware version is shown.

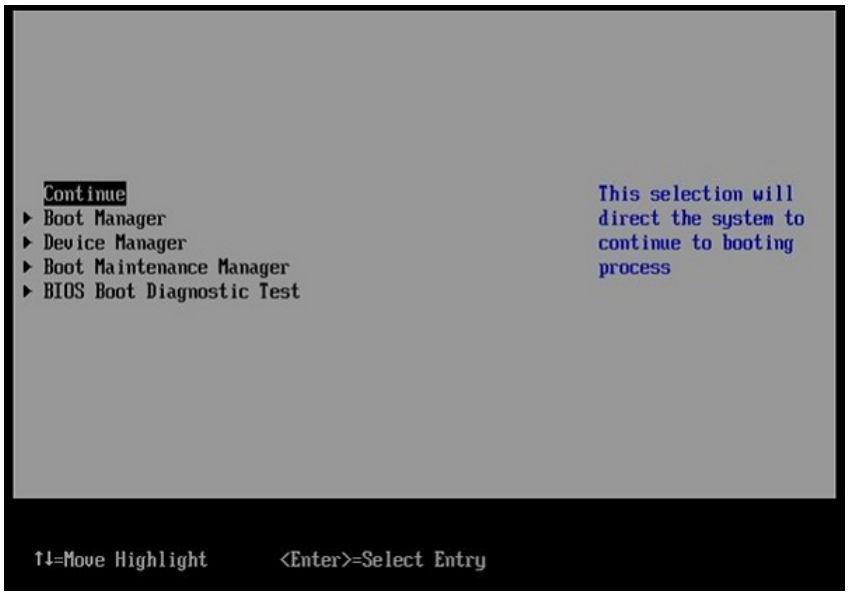
FIGURE J.20 Confirmation of UEFI driver version and firmware version


QLogic Fibre Channel Adapter (driver 2.24, firmware 5.07.000)
QLogic Fibre Channel Adapter (driver 2.24, firmware 5.07.000)
UEFI Driver Version
Firmware Version

   Note
   Window goes next automatically.

3. Boot Manager front page appears.

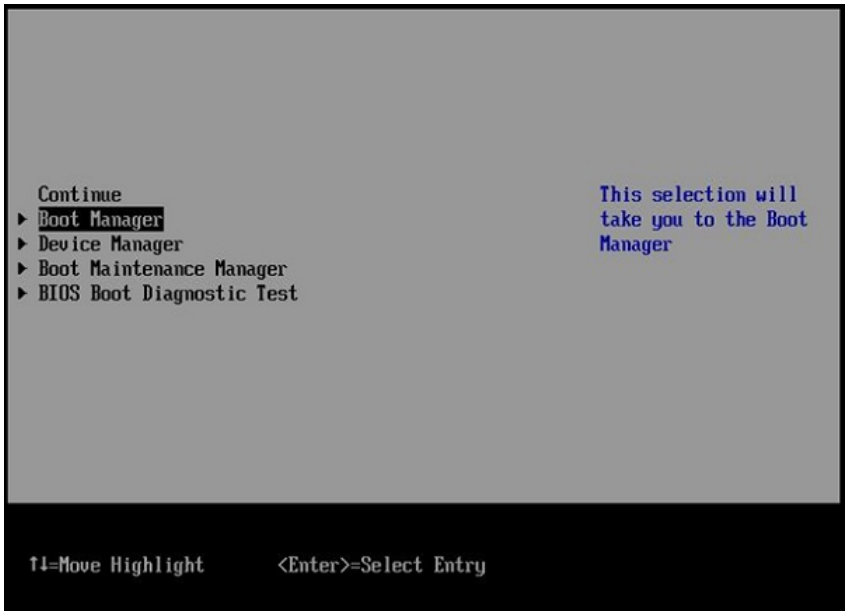
FIGURE J.21 Boot Manager front page (1)



Confirming UEFI driver version

1. Select [Boot Manager] and press [Enter] key.

FIGURE J.22 Boot Manager front page (2)



2. [Boot Manager] window appears. Select [EFI Internal Shell] and press [Enter] key.

FIGURE J.23 Boot Manager menu

3. UEFI Shell starts up. Input below command on EFI Shell.

```
Shell> drivers
```

4. List of driver appears.

FIGURE J.24 UEFI Shell

EFI Shell version 2.31 [0.38]
Current running mode 1.1.2
Device mapping table
blk0 :Removable BlockDevice - Alias (null)
PcieRoot(0x0)/Pci(0x1A,0x0)/USB(0x0,0x0)/USB(0x4,0x0)/Unit(0x0)
blk1 :Removable BlockDevice - Alias (null)
PcieRoot(0x0)/Pci(0x1A,0x0)/USB(0x0,0x0)/USB(0x4,0x0)/Unit(0x1)
blk2 :Removable BlockDevice - Alias (null)
PcieRoot(0x0)/Pci(0x1A,0x0)/USB(0x0,0x0)/USB(0x4,0x0)/Unit(0x2)
blk3 :Removable BlockDevice - Alias (null)
PcieRoot(0x0)/Pci(0x1A,0x0)/USB(0x0,0x0)/USB(0x4,0x0)/Unit(0x3)
blk4 :Removable BlockDevice - Alias (null)
PcieRoot(0x0)/Pci(0x1A,0x0)/USB(0x0,0x0)/USB(0x4,0x0)/Unit(0x4)
blk5 :Removable BlockDevice - Alias (null)
PcieRoot(0x0)/Pci(0x1A,0x0)/USB(0x0,0x0)/USB(0x4,0x0)/Unit(0x5)
blk6 :Removable BlockDevice - Alias (null)
PcieRoot(0x0)/Pci(0x1C,0x0)/Pci(0x0,0x0)/Ctrl(0x0)/Scsi(0x1,0x0)
blk7 :Removable BlockDevice - Alias (null)
PcieRoot(0x0)/Pci(0x1C,0x0)/Pci(0x0,0x0)/Ctrl(0x0)/Scsi(0x2,0x0)
Press ESC in 1 seconds to skip startup.nsh, any other key to continue.
Shell> drivers_

For details on UEFI operation, see "*PRIMEQUEST 2000 series User Interface Operating Instructions*" (C122-E176EN) and "*PRIMEQUEST 2000 series Tool Reference*" (C122-E177EN).

Note

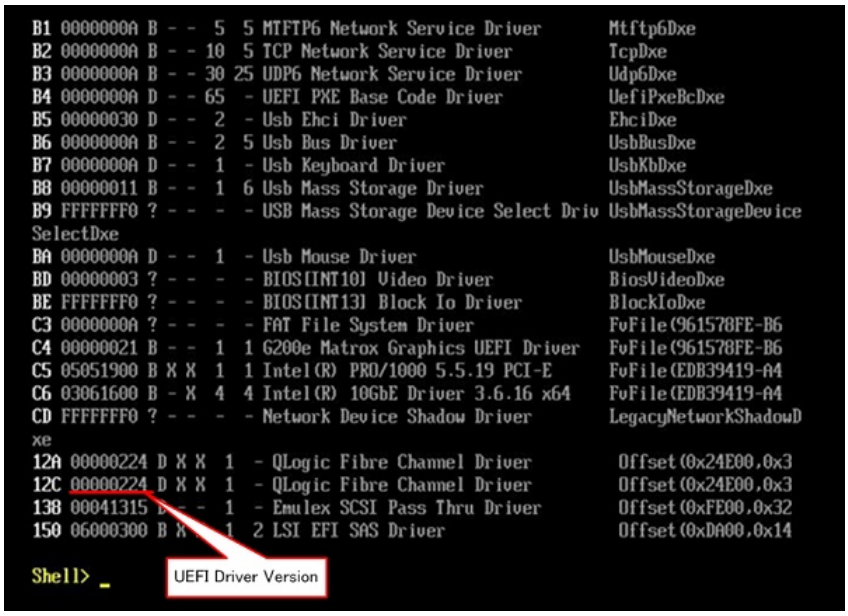
If driver list does not fall within window, input 'drivers -b'. Driver list is shown by a page.

FIGURE J.25 Driver list

B1 0000000A B - - 5 5 MTFTP6 Network Service Driver Mtftp6Dxe
B2 0000000A B - - 10 5 TCP Network Service Driver TcpDxe
B3 0000000A B - - 30 25 UDP6 Network Service Driver Udp6Dxe
B4 0000000A D - - 65 - UEFI PXE Base Code Driver UefiPxeBcDxe
B5 00000030 D - - 2 - Usb Ehci Driver EhciDxe
B6 0000000A B - - 2 5 Usb Bus Driver UsbBusDxe
B7 0000000A D - - 1 - Usb Keyboard Driver UsbKbDxe
B8 00000011 B - - 1 6 Usb Mass Storage Driver UsbMassStorageDxe
B9 FFFFFFF0 ? - - - - USB Mass Storage Device Select Driv UsbMassStorageDevice
SelectDxe
BA 0000000A D - - 1 - Usb Mouse Driver UsbMouseDxe
BD 00000003 ? - - - - BIOS[INT10] Video Driver BiosVideoDxe
BE FFFFFFF0 ? - - - - BIOS[INT13] Block Io Driver BlockIoDxe
C3 0000000A ? - - - - FAT File System Driver FvFile(961578FE-B6
C4 00000021 B - - 1 1 G200e Matrox Graphics UEFI Driver FvFile(961578FE-B6
C5 05051900 B X X 1 1 Intel(R) PRO/1000 5.5.19 PCI-E FvFile(EDB39419-A4
C6 03061600 B - X 4 4 Intel(R) 10GbE Driver 3.6.16 x64 FvFile(EDB39419-A4
CD FFFFFFF0 ? - - - - Network Device Shadow Driver LegacyNetworkShadowD
xe
12A 00000224 D X X 1 - QLogic Fibre Channel Driver Offset(0x24E00,0x3
12C 00000224 D X X 1 - QLogic Fibre Channel Driver Offset(0x24E00,0x3
138 00041315 D - - 1 - Emulex SCSI Pass Thru Driver Offset(0xFE00,0x32
150 06000300 B X X 1 2 LSI EFI SAS Driver Offset(0xDA00,0x14
Shell>

5. Check UEFI driver version
   Check version of QLogic Fibre Channel Driver.
   Example:
   '00000224' in version of UEFI driver means '2.24'.

FIGURE J.26 Confirmation of UEFI driver version


B1 0000000A B - - 5 5 MTFTP6 Network Service Driver Mtftp6Dxe
B2 0000000A B - - 10 5 TCP Network Service Driver TcpDxe
B3 0000000A B - - 30 25 UDP6 Network Service Driver Udp6Dxe
B4 0000000A D - - 65 - UEFI PXE Base Code Driver UefiPxeBcDxe
B5 00000030 D - - 2 - Usb Ehci Driver EhciDxe
B6 0000000A B - - 2 5 Usb Bus Driver UsbBusDxe
B7 0000000A D - - 1 - Usb Keyboard Driver UsbKbDxe
B8 00000011 B - - 1 6 Usb Mass Storage Driver UsbMassStorageDxe
B9 FFFFFFF0 ? - - - - USB Mass Storage Device Select Driv UsbMassStorageDevice
SelectDxe
BA 0000000A D - - 1 - Usb Mouse Driver UsbMouseDxe
BD 00000003 ? - - - - BIOS[INT10] Video Driver BiosVideoDxe
BE FFFFFFF0 ? - - - - BIOS[INT13] Block Io Driver BlockIoDxe
C3 0000000A ? - - - - FAT File System Driver FvFile(961578FE-B6
C4 00000021 B - - 1 1 G200e Matrox Graphics UEFI Driver FvFile(961578FE-B6
C5 05051900 B X X 1 1 Intel(R) PRO/1000 5.5.19 PCI-E FvFile(EDB39419-A4
C6 03061600 B - X 4 4 Intel(R) 10GbE Driver 3.6.16 x64 FvFile(EDB39419-A4
CD FFFFFFF0 ? - - - - Network Device Shadow Driver LegacyNetworkShadowD
xe
12A 00000224 D X X 1 - QLogic Fibre Channel Driver Offset(0x24E00,0x3
12C 00000224 D X X 1 - QLogic Fibre Channel Driver Offset(0x24E00,0x3
138 00041315 D - - 1 - Emulex SCSI Pass Thru Driver Offset(0xFE00,0x32
150 06000300 B X X 1 2 LSI EFI SAS Driver Offset(0xDA00,0x14
Shell>
UEFI Driver Version

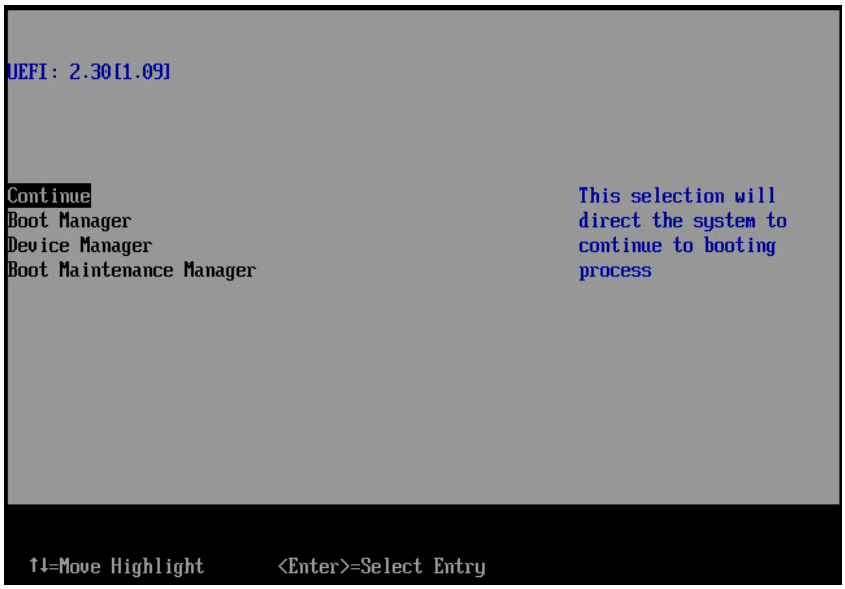
Note
For a FC card made by Qlogic, you can confirm the firmware version only when a partition starts up.

J.3.2 How to confirm firmware version for FC card made by Emulex

Displaying Device Manager

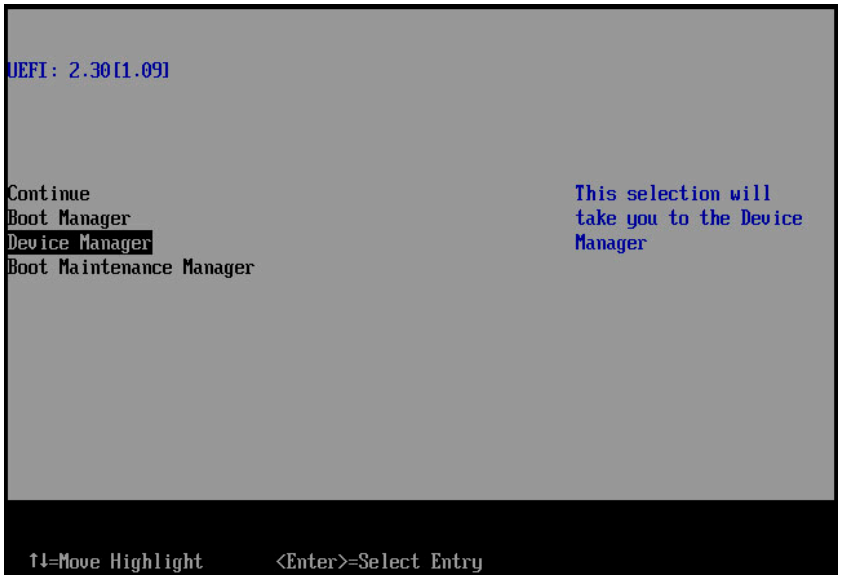
1. Select [Force boot into EFI Boot Manager] by [Boot Selection] in [Power Control] window of MMB Web-UI.
   Partition is powered on and logo of FUJITSU appears.

FIGURE J.27 Boot Manager front page (1)



2. Select [Device Manager] and press [Enter] key.

FIGURE J.28 Boot Manager front page (2)



3. [Device Manager] window appears.

Stating HBA setup utility

1. Select [Emulex Configuration Utility Ver: x.xxxx] in [Device Manager] window and press [Enter] key.

FIGURE J.29 [Device Manager] window

2. [Emulex Configuration Utility] window appears. Select [Emulex Configuration Setup Utility] and press [Enter] key.

FIGURE J.30 [Emulex configuration Utility] window

3. A list of HBA appears.

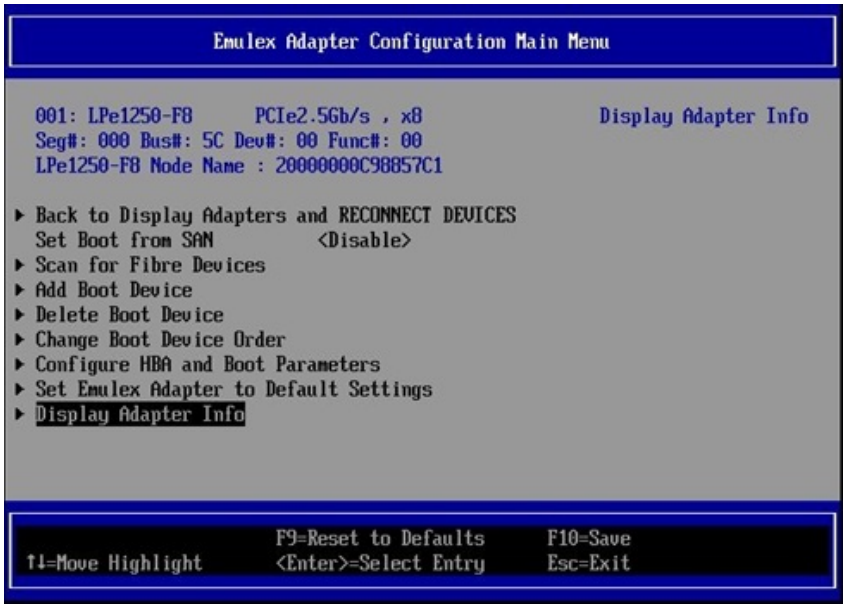
Selecting HBA

1. Select HBA in [Adapter Selection] window and press [Enter] key.

FIGURE J.31 [Adapter Selection] window (HBA list)

2. [Emulex Adapter Configuration Main Menu] window appears.

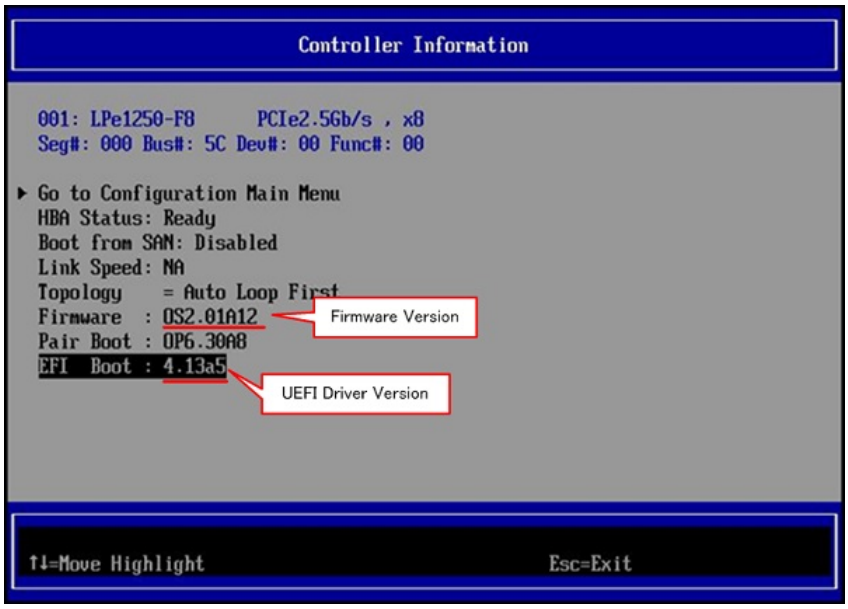
FIGURE J.32 [Emulex Adapter Configuration Main Menu] window



Confirming version of FC card.

1. Select [Display Adapter Info] in [Emulex Adapter Configuration Main Menu] window and press [Enter] key.
2. [Controller Information] window appears. Check firmware version and UEFI driver version.

FIGURE J.33 [Controller Information] window



Note
Press [Esc] key sometimes and go back to top menu.

Appendix K Software (Link)

For details on bundled software and drivers supplied with the PRIMEQUEST 2000 series hardware, see Chapter 3 Software Configuration in the PRIMEQUEST 2000 Series General Description (C122-B022EN).

Appendix L Failure Report Sheet

This appendix includes the failure report sheet. Use this sheet to report a failure.

L.1 Failure Report Sheet

Model name	□ PRIMEQUEST ( )
OS	□ Red Hat Enterprise Linux (Version:) □ Windows Sever (Version:) □ VMware (Version:)
Server installation environment	
LAN/WAN system configuration	
Hardware configuration	(Installed option types and locations)
Configuration information	(UEFI Setup Utility settings)
Occurrence date and time	Year Month Day Hour Minute
Frequency	□ Constantly □ Intermittently (times per) □ Unknown
Triggered by	Working before failure occurred? □ Yes □ No Current situation: Work details: Work affected? □ Yes □ No
Symptom	□ Hanging □ Slowdown □ Reboot □ OS panic/stop □ OS startup not possible □ Communication unavailable □ Other ( )
Error message	System event log: Agent log/Driver log: OS message: Other:
Status of various lamps	
Supplementary information	□ Yes □ No

Appendix M Information of PCI Express card

This appendix includes the information of PCI Express card.
For components which cannot be identified by 'Vendor ID' and 'Device ID', see also 'Subsystem ID' and 'Subsystem Vendor ID'.

TABLE M.1 Information of PCI Express card

Name	Vendor ID	Device ID	Subsystem ID	Subsystem Vendor ID
Single Channel 8Gbps Fibre Channel Card	10DF	F015	-	-
Dual Channel 8Gbps Fibre Channel Card	10DF	F100	-	-
Single Channel 8Gbps Fibre Channel Card	1077	2532	015C	1077
Dual Channel 8Gbps Fibre Channel Card	1077	2532	015D	1077
Single Channel 16Gbps Fibre Channel Card	10DF	E200	E207	10DF
Dual Channel 16Gbps Fibre Channel Card	10DF	E200	E208	10DF
Dual Channel 1000BASE-T Card	8086	1521	11CF	8086
Quad Channel 1000BASE-T Card	8086	1521	11D1	8086
Dual Channel 1000BASE-T Card	8086	1521	00A2	8086
Quad Channel 1000BASE-T Card	8086	1521	00A1	8086
Dual Channel 10G BASE-T Card	8086	1528	-	-
Dual Channel 10G BASE Card	8086	10FB	-	-
Dual Channel FCoE card (10Gbps)	19A2	0704 (FCoE) 0700 (Ethernet Controller)	-	-
Single channel 40Gbps Infiniband HCA card	15B3	1003	11EE	15B3
Dual channel 40Gbps Infiniband HCA card	15B3	1003	11EF	15B3
Single channel 56Gbps Infiniband HCA card	15B3	1003	0022	15B3
Dual channel 56Gbps Infiniband HCA card	15B3	1003	0020	15B3

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